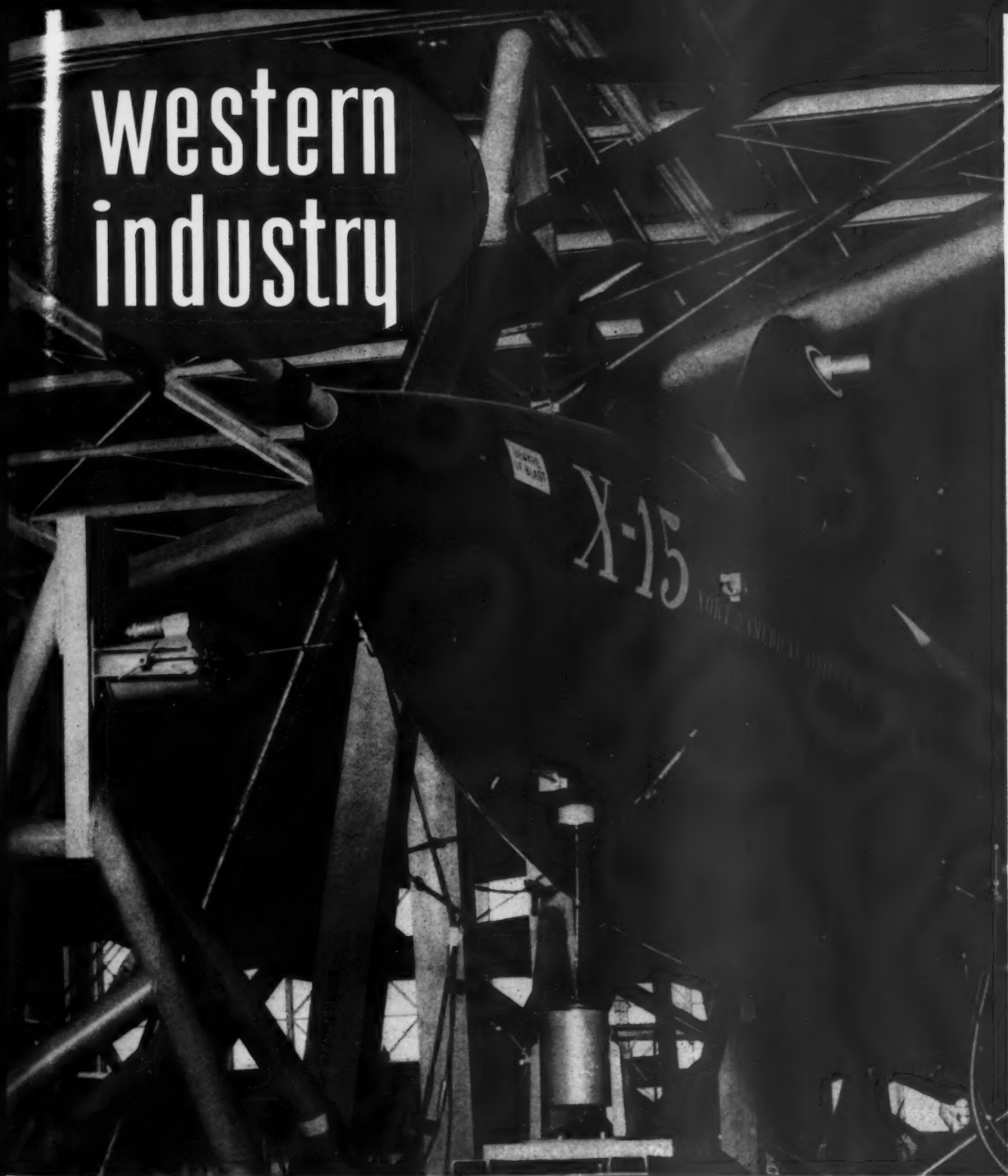
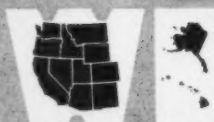


# western industry



JULY

1959



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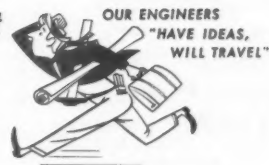
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<b>SPECIAL REPORT</b>	<b>35</b>	<i>Material handling on the production line</i>
	<b>39</b>	<i>Special manuals on production line M-H; hose and couplings</i>
<b>METALS (Cover story)</b>	<b>21</b>	<i>Space Age production for the X-15</i>
	<b>23</b>	<i>Heart and muscles of X-15</i>
	<b>31</b>	<i>Centrifugal force for abrasive cleaning</i>
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COVER PHOTO—The X-15 being mated to the wing of the B-52. The rocket ship is then launched from the larger plane. See story p. 21.

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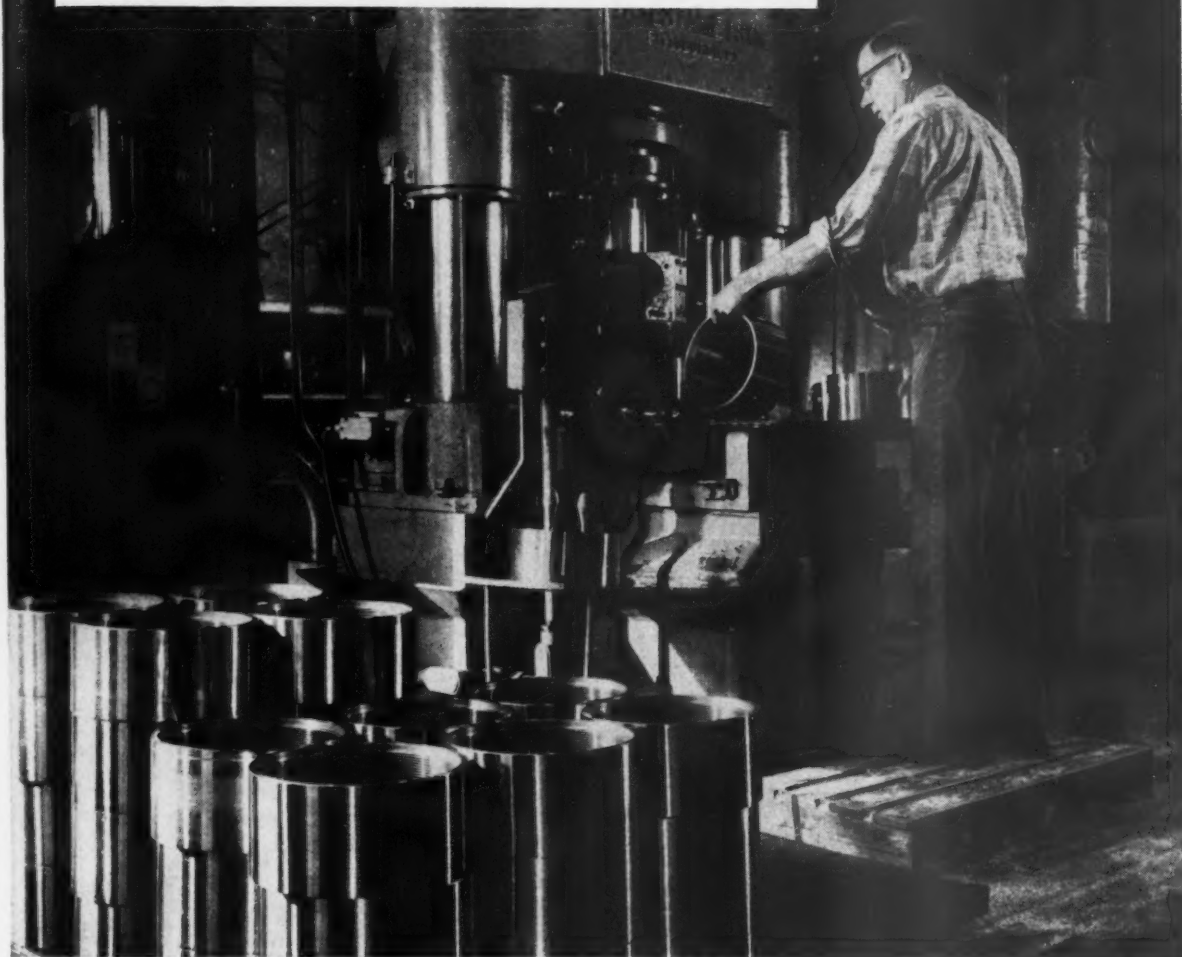
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## STANDARD ENGINEER'S REPORT



# Close tolerances...yet Chevron Cutting Oil increases cutting speeds and tool life

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**Lakewood Pipe Coupling and Service**, Bellflower, Calif., found they could increase thread tapping speeds with Chevron Cutting Oil 210 TA and still meet API Class 3 tolerances.

"We not only cut smoother threads at higher speeds," reports President Frank Tybus, "but chasers last longer, too!"

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**Equipment note:** This Stamets tapping machine (above) cuts threads in mild steel 8-inch pipe couplings in less than 3 minutes using Chevron Cutting Oil. Machine uses Landis circular chasers.

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2,000 to 50,000 pound capacities

a new concept  
in the application  
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## What Is Balanced Design?

Balanced Design means that each part in the new P&H Hevi-Lift hoist has been balanced or matched with every other part for strength, temperature and performance characteristics. *There are no weak parts!* Each part is as strong and dependable as every other part.

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What will new Balanced Design P&H Hevi-Lifts do for you? For one thing, you'll never again be plagued with petty hoist breakdowns that cost pennies to repair, but mean dollars in lost production. Simply stated, *the new Hevi-Lift will stand up longer under heavier duty cycles with less maintenance than any other hoist made today!*

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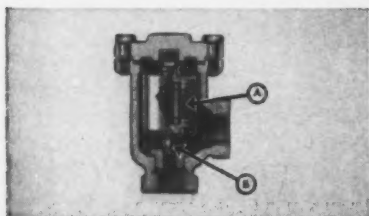
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# Full-range steam traps cut high cost of steam pressure variations

By John W. Ritter, Test Engineer  
SARCO Company, Inc.

While boiler room economics dictate that boiler pressures remain constant, the equally sound economics of batch processing may decree that pressures at the equipment vary with the requirement of the process. The attempt to choose a steam trap that is all things to all conditions may result in installing traps that operate inefficiently at either extreme of their pressure range or that require adjustment every time the operations sheet calls for another pressure-temperature setting. Orifice traps represent a somewhat more rational approach to the problem, but often at the price of a continuous discharge of steam, particularly at the low pressures of start-up and shut down. Compromise, adjustment, and steam waste all spell inefficiency in the utilization of steam.

**Production-Planned** steam trapping, on the other hand, improves efficiency by the use of properly designed and installed thermostatic steam traps. Such traps employ the expansion and contraction of a thermostatic element to operate the discharge valve.

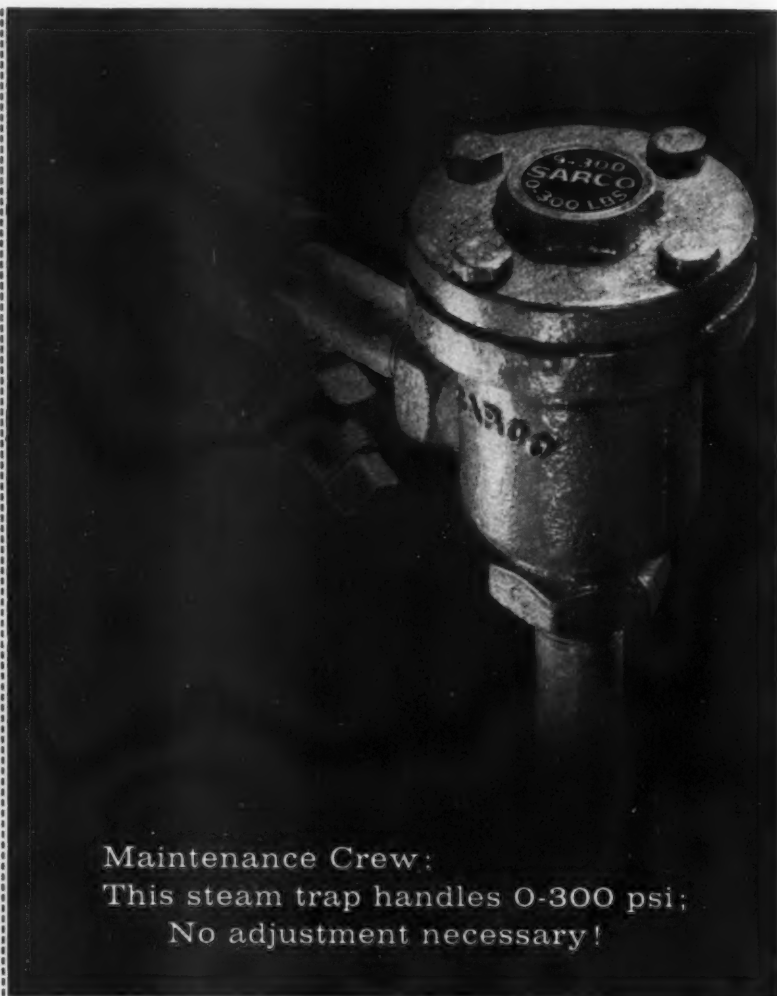


In Sarco Thermostatic Steam Trap, element (A) expands at steam temperature to close valve (B), contracts to permit discharge of condensate.

In the Sarco "Balanced Pressure" Thermostatic Steam Trap a volatile fluid is sealed inside a metal bellows that opens or closes the valve as it contracts or expands with condensate temperature. Near steam temperature, evaporation of the fluid creates an internal pressure greater than steam pressure in the trap body, and the expanding bellows seats the valve. When the condensate cools, the element contracts and opens the valve.

It is evident that at steam temperature pressure inside the element is higher than steam pressure, no matter how the latter may vary. Thus, the trap compensates automatically for variations in pressure.

58108



Maintenance Crew:  
This steam trap handles 0-300 psi;  
No adjustment necessary!

Sarco "Balanced Pressure" Thermostatic Steam Traps cut trap maintenance costs and simplify parts inventory. Why? Because the same bellows, head and seat handle steam pressures up to 300 psi — without any need of adjustment for variations in load or pressure.

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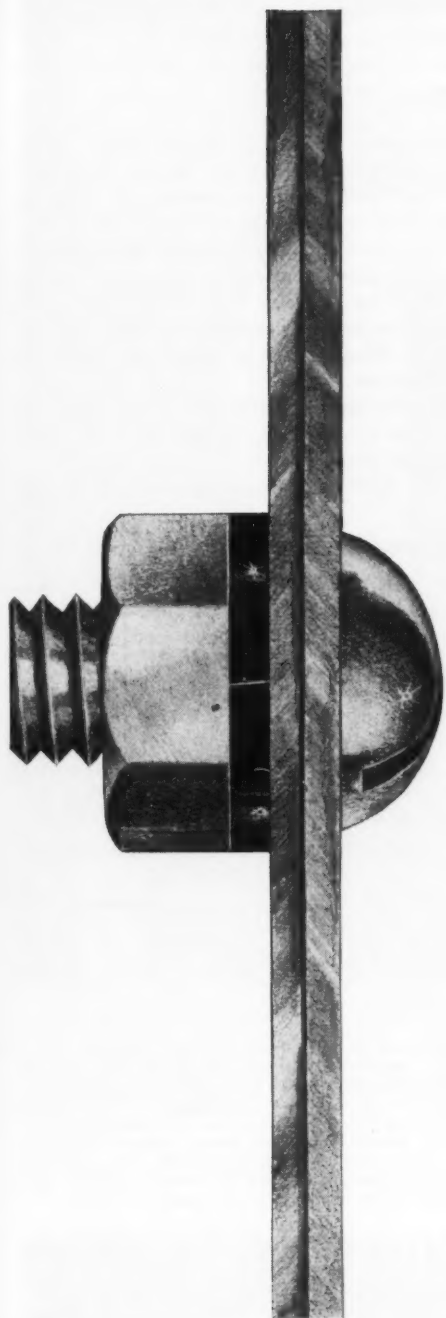
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WESTERN INDUSTRY/JULY 1959





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western industry

# western meetings

## WESCON shaping up

MORE FINAL PLANS have been announced for the Western Electronic Show and Convention (WESCON) scheduled August 18-21 at the Cow Palace in San Francisco.

The Technical Program Committee has selected 120 papers to be presented three-each in 40 morning and afternoon sessions. A 41st regular session on "Human Factors in Engineering" will involve a four-man panel without formal papers. There will also be a special evening session with the title "The International Geophysical Year in Retrospect." The speaker will be Dr. Lloyd Berkner of New York, president of Associated Universities which operates Brookhaven National Laboratories.

An All-Industry luncheon will culminate activities of this year's WESCON. The luncheon will be held in the Gold and Nob Hill rooms of the Fairmont Hotel on Friday, August 21. Speaker will be Dr. Herbert F. York, director of defense research and engineering and one of the top policymakers in the U. S. Department of Defense.

The luncheon will also honor the winner of the Electronic Achievement Award by the Seventh Region of the Institute of Radio Engineers. The San Francisco and Los Angeles sections of the IRE and the Western Electronic Manufacturers Association are co-sponsors of WESCON.

## New name for electronics group

THE NATION'S SECOND LARGEST electronic trade association (formerly the West Coast Electronic Manufacturers Association) has officially taken a new name, the Western Electronic Manufacturers Association.

John A. Chartz, WEMA president, said the name change reflects the growth of electronics throughout all the Western states. Western firms account for 23% of the Nation's total \$7,800,000,000 sales volume and make up 19% (134,000) of the manufacturing employment.

WEMA officers for 1959 are: President, John A. Chartz, Vice-President and General Manager, Dalmo Victor Co., San Carlos, Calif.; Vice-President, Richard B. Leng, Vice-President, Technical Products Div., Packard-Bell Electronics Corp., Los Angeles; Vice-President, William Ivans, Jr., Vice-President, Engineering, Kin Tel, a div. of Cohu Electronics, San Diego; Vice-President, L. R. Rockwood, Vice-President, Engineering, ESI, Inc., Portland; Secretary, J. D. McLean, President, Hoffman Laboratories, a div. of Hoffman Electronics Corp., Los Angeles; Treasurer, Philip L. Gundy, Vice-President, Ampex Corp., Redwood City, Calif.

## Lineup of Material Handling shows

THE NEXT TWO YEARS will see at least three gigantic Material Handling shows in the West.

On May 11-12-13 of 1960, the Third Western Regional Material Handling Show will be held at the Great Western Exhibit Center in Los Angeles. This show is sponsored, approved and endorsed by the Los Angeles chapter of the American Material Handling Society. Besides exhibits of all types of material handling equipment, the National Championship Fork Truck Rodeo will be staged.

On July 19-20-21 of 1960, the Western Packaging and Materials Handling Exposition will be held at the Pan Pacific Auditorium in Los Angeles. This show will be sponsored by top leaders in the packaging and materials handling fields in the West, as well as leading national firms with Western divisions.

And the Material Handling Institute has scheduled its Pacific Coast Show for Feb. 22, 23 and 24, 1961, at the Cow Palace in San Francisco.

So mark those dates on your calendars for the future.

## MHI sets regional show policy

A REGIONAL TRADE SHOW PROGRAM has been announced by the Material Handling Institute, which would see at least four material handling shows scheduled within the next two years.

One of these shows will be the Pacific Coast Show, scheduled from February 22 through 24, 1961, at the Cow Palace, in San Francisco.

The shows will be endorsed by the Material Handling Equipment Distributors Association and the American Material Handling Society. AMHS will have the responsibility for technical and educational sessions that will accompany the show.

... continued on p. 12

**WESTERN CHAMPS**—(Left to right): Frank Johnson, Lockheed Aircraft Corp., who is the newly-elected National President of the American Institute of Industrial Engineers (AIIE); L. R. Becht, Naval Air Station, San Diego, president of the San Diego chapter (shown receiving the Frank F. Groseclose award as the "Outstanding AIIE chapter of year") and George Gustat, Eastman Kodak Co., retiring national AIIE president. Tearsheets of Mr. Becht's article in the May **WI**, "Technical Chapters—are they really effective?", are still available. Indicate your wish on the Reader Service Postcard in this issue.





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## MEETINGS

(continued)

### Puget Sound AMHS reactivated

THE PUGET SOUND CHAPTER of the American Material Handling Society (AMHS), which was disbanded a couple of years ago (Feb. WI, p. 8) is in the process of reactivation.

Leader in this movement is Lyle Lindquist, Boeing Airplane Co., Renton, Wash., who is acting as president. Mr. Lindquist has taken over the old membership list and treasury, and is seeking to round up new members.



Lyle Lindquist, Boeing Airplane Co., Renton, Wash., new head of Puget Sound chapter, AMHS.

First meeting is planned for Sept. 15 at The Broiler in Seattle. All those interested in attending may contact Mr. Lindquist at Boeing, Box 707, Renton, Wash. The meeting is open to all interested or working with material handling.

Other officers of the reactivated chapter include: Vice President, Russ Daley, manufacturers' agent; Secretary, Halton Lysons, Boeing; Treasurer, George Cooper, Boeing. An election is planned soon to select new officers.

Further details on the September meeting and plans for the chapter reactivation will appear in future issues of WESTERN INDUSTRY.

### SPHE-AMHS shouldn't duplicate

"THERE IS NO REASON why SPHE and AMHS shouldn't both continue to be effective organizations, so long as they do not try to duplicate each other's efforts," Capt. W. C. G. Brouwers, President of the Golden Gate chapter of SPHE, told a Western Industry editor during a recent visit to Los Angeles.

Commenting on the break-down in negotiations for a merger between the Society of Packaging and Handling Engineers and the American Material Handling Society, Capt. Brouwers added:

"There has been too much effort directed by both societies toward bettering the activities of the other, instead of focusing attention on their specialized fields. Because one group held a meeting on packaging, the other felt obliged to come up with something in that area too. And vice-versa.

"All this has produced," Capt. Brouwers said, "is friction. SPHE should concentrate on the packaging aspect of materials handling, while AMHS should concern them-

selves with the overall physical handling field. This way each group could contribute knowledge to the other regarding developments in the two separate fields.

"There is important work to be done by both societies," Capt. Brouwers concluded, "but unless each recognizes the area in which that work should be done, they will simply continue to duplicate each other's efforts."

### Douglas Fir Plywood Association officers

NEW PRESIDENT of the Douglas Fir Plywood Association is C. Henry Bacon, Jr., executive vice president of Simpson Timber Co., Seattle.

Other new officers are John Martinson, Puget Sound Plywood, Inc., Tacoma, vice president; A. P. Stinchfield, Menasha Plywood Corp., North Bend, secretary; Corydon Wagner, Jr., St. Paul & Tacoma Lumber Co., Tacoma, treasurer. Named as trustees were T. L. Bentley, Anacortes; V. K. Wright, McMinnville, and Joseph Smith, Everett.

Demand for plywood is expected to reach a record rate of 150,000,000 feet a week in the first half of 1960, up 3% from the current record of 146,000,000 sq. ft.

### Wood Industries conference

THE WOOD INDUSTRIES CONFERENCE will be held on September 10-12 in Portland, Oregon.

The conference is being sponsored jointly by the American Society of Mechanical Engineers, Wood Industries Div.; Forest Products Research Society, Pacific Northwest and Inland Empire Sections; and the American Institute of Chemical Engineers, Washington-Oregon Section.

Further information may be obtained from Louis P. Growney, c/o Pacific Power & Light Co., 404 Public Service Building, Portland 4, Oregon.

### New AIPE officers



AIPE OFFICERS—Upper left are (l. to r.): Davenport Browne, C. N. Swenson Co., San Jose, new president, and Roger Theiss, secretary, of the Santa Clara chapter. Above (l. to r.): Gus Kissner, retiring Western VP; Ken Buckley, retiring president, San Francisco chapter; C. A. Gallaher, new Western regional VP; Harvey Zieber, retiring president of Santa Clara chapter. At left is Milt Laursen, new president of San Francisco chapter.

### Western nominees for SPHE

THE WEST IS WELL REPRESENTED in nominations for top executive posts in the national Society of Packaging and Handling Engineers (SPHE).

Charles Lippman, Columbia-Geneva Div. of U. S. Steel Corp., who has served the past year as National Executive Vice President of SPHE, has been nominated for President. And Harold Kilmer, North American Aviation, who has been Western Regional Director this past year, has been nominated as a National Vice President.

Elections will take place this fall.

... continued on p. 16

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WAY  
THAN  
WITH  
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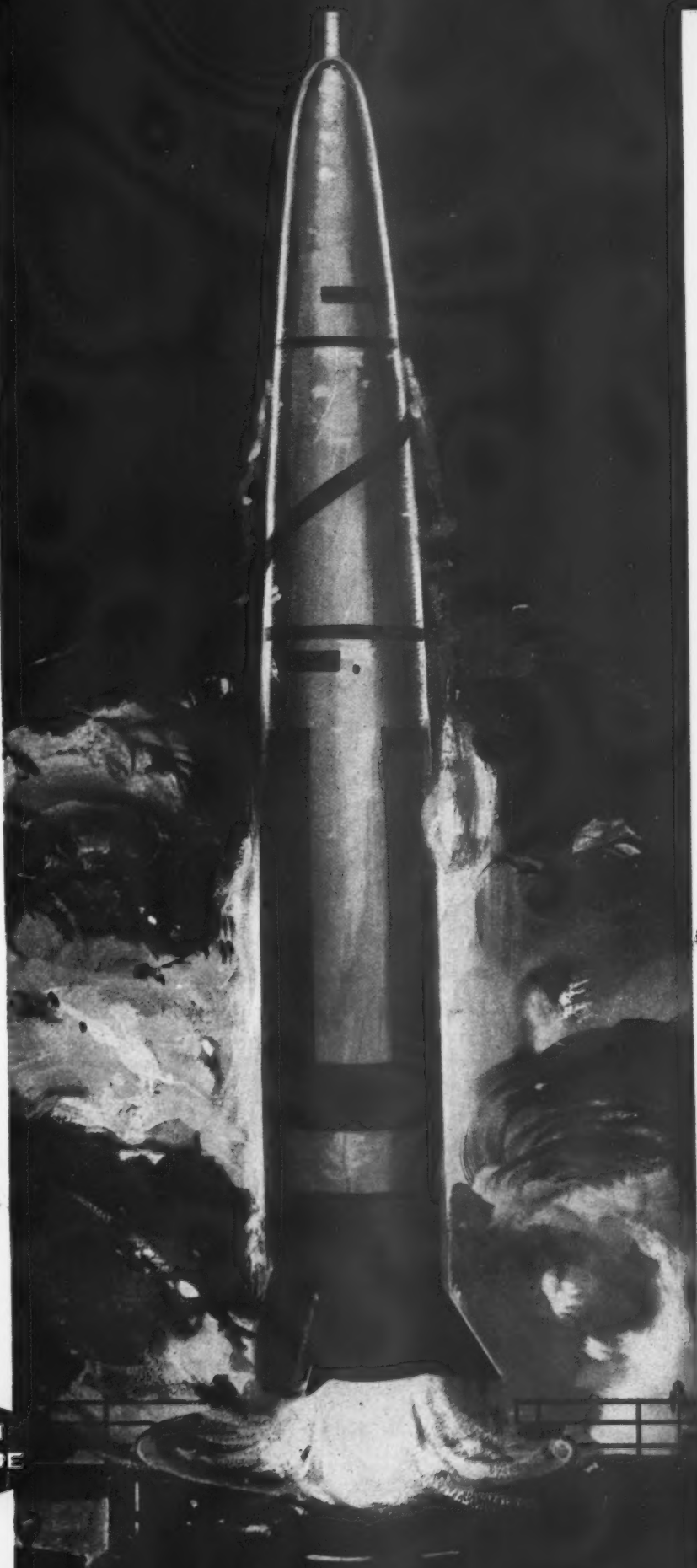
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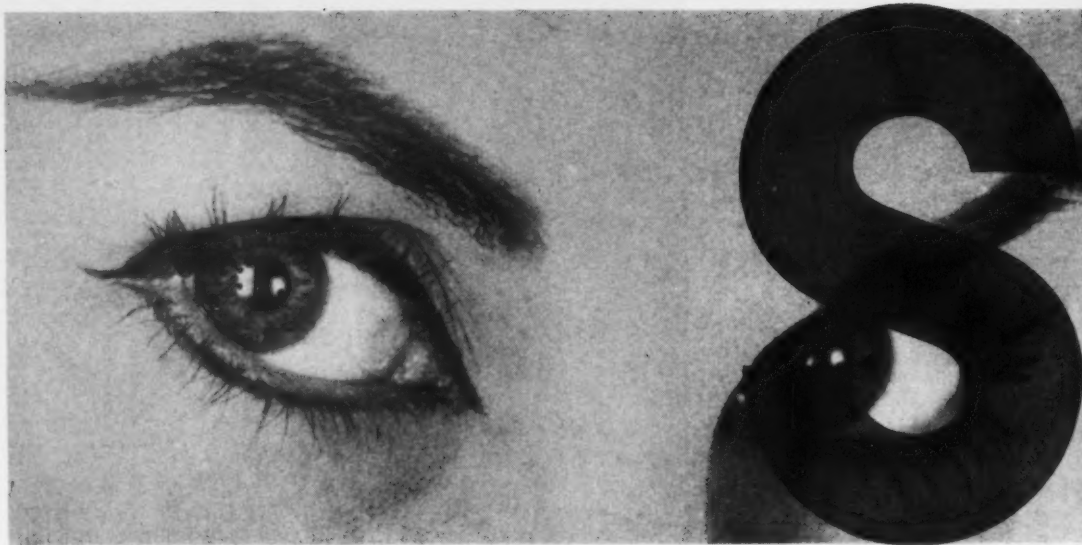
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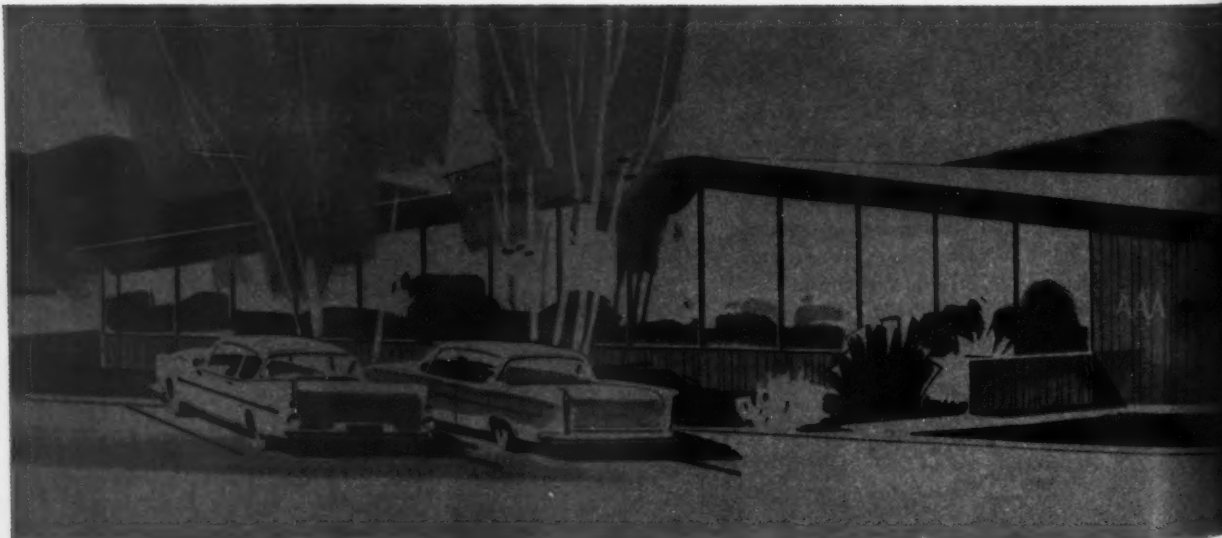






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## MEETINGS

(continued)

### American Welding Society papers

PAPERS ON WELDING or related subjects are invited for presentation at the 41st Annual Meeting and Welding Exposition slated April 25-29, 1960, in Los Angeles.

All applications, abstracts and manuscripts are screened by the Society's Technical Papers Committee. Each abstract should contain not less than 500—but preferably not more than 1000—words.

Abstracts must reach AWS not later than August 15, 1959, to insure consideration for the Los Angeles program. Copies of the author's application forms may be obtained from the American Welding Society, Dept. P, 33 West 39th St., New York 18, N. Y.

### 10th Biennial Electrical Industry Show

THE 10TH BIENNIAL ELECTRICAL INDUSTRY SHOW, slated for March 23-26, 1960, in Los Angeles, will be augmented by the Lighting Exposition.

In addition to 350 booths of industrial electrical interest, 150 exhibits will be devoted to new developments in commercial and industrial lighting fixtures.

There will also be speakers on subjects relating to the electrical field and the lighting field. Chairmen include Robert N. Marcum, Hughes Aircraft Co.; Charles H. Hays, The Electrical Estimators, Inc., and Urban Beh, consulting lighting engineer.

**NEW OFFICERS, L.A. AMHS**—New officers of the Los Angeles chapter of the American Material Handling Society are pictured below. Seated (l. to r.): Warren Burman, Hyster Co., treasurer; Charles Shibel, So. Calif. Gas Co., secretary; W. B. Semco, W. B. Semco & Associates, president; Wally Brucks, Oscar Mayer Packing Co., vice-president.

### New Region IX AMHS head

NEW WESTERN REGIONAL vice president (Region IX) of the American Material Handling Society (AMHS) is Louis Savard, Crown Zellerbach Ltd., Vancouver, B. C. He replaces Ben Hunt, Consolidated Industries Ltd.

Region IX covers Oregon, Washington, Vancouver and other states to the north and west of the Oregon-California border. Western vice president of Region VII, which encompasses the rest of the West, is Hiram Smith, Matson Terminals, San Francisco.

### National ASTM meeting

THE THIRD PACIFIC AREA and National Meeting of the American Society for Testing Materials, Oct. 11-16 in San Francisco, will set a record for technical programs for the group.

There will be 53 technical sessions, five industry lunches, an exhibit of instruments and apparatus, a group of educational visits to industrial laboratories and plants, and an extensive ladies' entertainment program.

### No. Calif. AMHS membership champs

THE NORTHERN CALIFORNIA chapter of the American Material Handling Society (AMHS) tied with the Minnesota chapter for first place in Class "M" (chapters of second size) in amount of membership gain.

An award was presented to No. Calif. membership chairman, Leo Delvanthal, who was recently elected president of the chapter.

... continued on p. 18

Standing are Directors (l. to r.): Frederick Bassick II, Douglas Aircraft Co., Inc.; Roland Renaud, Certified Wholesale Grocers; Roy L. Hill, Arrowhead & Puritas Waters, Inc.; J. Alden Lane, Amercon Corp.; Tom Brown, Exide Div. of Electric Storage Battery Co.; Richard Sanford. Other Directors include Don Ferguson, A. E. Flinck, Stanley E. Morris.



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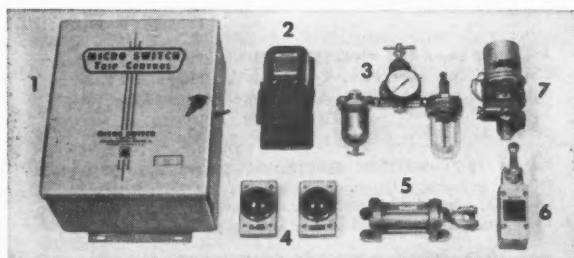
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## MEETINGS

(continued)

### Western winners, Clark-AMHS contest

WESTERNERS WON THREE PRIZES in the annual Clark Equipment Co.-American Material Handling Society contest held in conjunction with the national AMHS convention last month.

C. Jay Rockstead, chief development and systems engineer, Hawaiian Commercial & Sugar Co., Ltd., Puunene Maui, Hawaii, won first prize of \$2,000 for his paper "Material Handling—Tomorrow's Solution of Today's Problems". The complete paper is printed in this issue of WESTERN INDUSTRY, starting on p. 28.

Other Western winners were Kenneth A. Current, San Jose, who won fifth prize of \$300; and George W. Orton, Kirtland Air Force Base, New Mexico, who won ninth prize of \$125.

### Investment Casters Society officers

NEW OFFICERS of the Los Angeles Investment Casters Society are: President, Allen Smith, of Picco Inc.; Vice-President, Myron Orbach, Bone Engineering; Secretary-Treasurer, Dick Ellis, Dick Ellis Co. Members of the Board of Directors will be the officers and Hank Bryk, Rex Precision; Frank Taylor, Joseff; George Ward of Arwood Precision Casting Corp. Lawrence Schwedes, outgoing president, will act as Chairman of the Board of Directors.

The past year was highlighted by a design clinic which was well received and is now being scheduled as an annual affair. The society conducts meetings the third Thursday of each month, featuring noted speakers. Anyone interested in attending these meetings should contact the new officers.

### Progress in plastics engineering

"PROGRESS IN PLASTICS ENGINEERING" will be the general theme of a technical conference planned for

October 13 and 14 in Los Angeles by the Southern California section of the Society of Plastics Engineers.

The meeting, to be held at the Ambassador Hotel, will feature 20 to 25 papers presented by leading engineers and scientists. Jack Fuller, Chemtrol Div., Rexall Drug and Chemical Co., will head the meeting as general chairman.

### Wood Pallet Meeting

THE FIRST WESTERN MEETING of the National Wooden Pallet Manufacturing Assn. resulted in the abandonment of the Western division and the adoption of a 4-Point Pallet Program to aid pallet purchasers. For complete details, see news story starting on p. 78.

### AMHS award of merit

AN AWARD OF MERIT has been made to J. Alden Lane for outstanding service as treasurer of the Los Angeles chapter of the American Material Handling Society since 1953.

The presentation was made at the chapter's June meeting held at Anderson's Cuisine Restaurant in Los Angeles, where President Tony Flinck expressed deep gratitude for the assistance given by Alden Lane to members of the various committees, and to the chapter in general.

Tony Flinck, past president of the LA chapter of AMHS, presents Award of Merit to J. Alden Lane, Amercon Corp.



### Western Meetings You Should Attend

**August 12-14—X-RAY ANALYSIS MEETING.** 8th annual meeting. Stanley Hotel, Estes Park, Colo. Further information may be obtained from Wm. M. Mueller, conference chairman, Metallurgy Div., Denver Research Institute, University of Denver, Denver 10, Colo.

**August 18-21—WESTERN ELECTRONIC SHOW and CONVENTION.** Technical program and exhibits at Cow Palace, San Francisco. For further info, contact WESCON headquarters, 1435 South La Cienega Blvd., Los Angeles.

**Sept. 10-12—WOOD INDUSTRIES CONFERENCE.** Sponsored by leading engineering and lumbering societies in Portland, Ore. Contact Louis P. Grownney, c/o Pacific Power and Light Co., 404 Public Service Bldg., Portland 4, Ore.

**Sept. 17—BAY AREA QUALITY CONTROL CONFERENCE.** Stanford University. Contact Lyle Connell, Westinghouse Electric Corp., Sunnyvale, Calif.

**Oct. 11-16—AMERICAN SOCIETY for TESTING MATERIALS.** Third Pacific Area and National Meeting. Sheraton-Palace Hotel, San Francisco. For further information, write: ASTM, 1916 Race St., Philadelphia 3, Pa.

**Oct. 13-14—SOUTHERN CAL. SOCIETY OF PLASTICS ENGINEERS.** "Progress in Plastic Engineering" will be the general theme of the technical conference. Scheduled for the Ambassador Hotel, Los Angeles. Contact Jack Fuller, Chemtrol Div., Rexall Drug and Chemical Co., for further details.

**Nov. 2-8—FURNITURE MANUFACTURERS ASSN. OF CALIF.** Annual convention in Honolulu. Contact Public Relations Dept., Los Angeles Home Furnishings Mart, 1933 South Broadway, Los Angeles 7, Calif.

### 1960

**Feb. 4-6—GOLDEN GATE METALS CONFERENCE.** Fairmont Hotel, San Francisco. Further information from R. L. Ray, Pyromet Brazing & Heat Treating Co., So. San Francisco.

**March 23-26—10th BIENNIAL ELECTRICAL INDUSTRY SHOW.** Augmented by the Lighting Exposition. To be held at Shrine Exposition Hall, Los Angeles. Sponsored by the Electrical Maintenance Engineers Association of Southern California. For further details, contact Fred J. Tabery, 3443 South Hill St., Los Angeles 7, Calif.

**April 25-29—AMERICAN WELDING SOCIETY.** 41st annual meeting and welding exposition, Los Angeles. For further information write American Welding Society, Dept. P, 33 West 39th St., New York 18, N. Y.

**May 3-5—WESTERN JOINT COMPUTER CONFERENCE.** Theme will be "Computers—Challenge of the Next Decade." Sponsors are the Institute of Radio Engineers, AIEE, and Association for Computing Machinery. Meeting will be in San Francisco. Write to Box 214, Station A, Palo Alto, for further details.



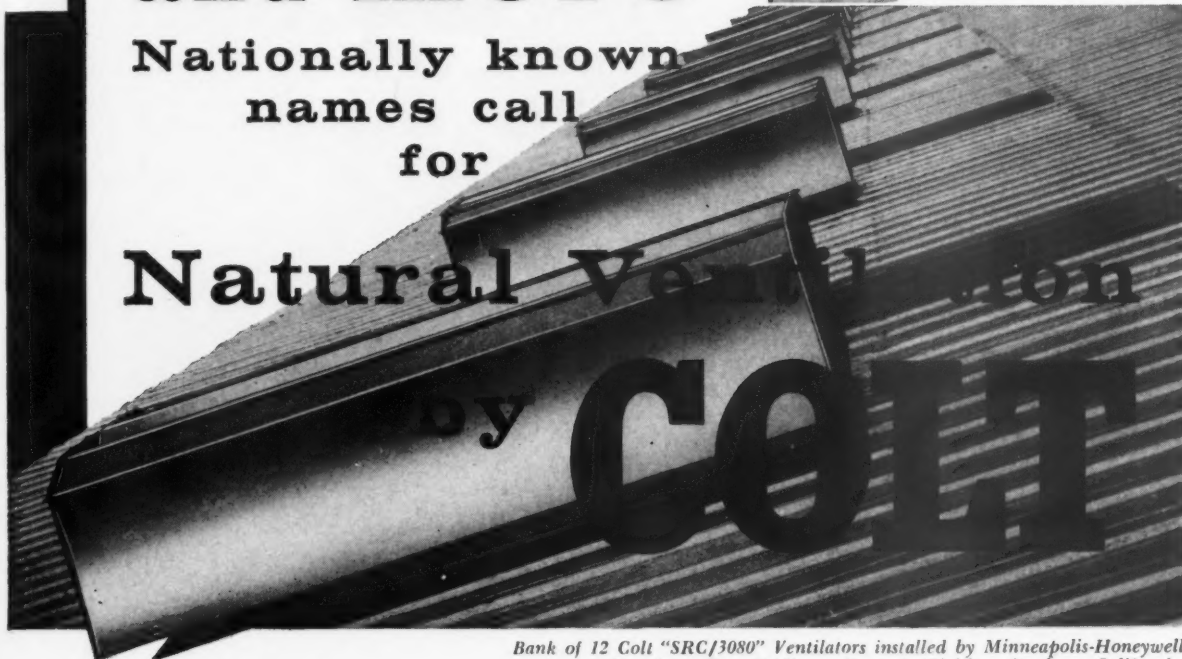
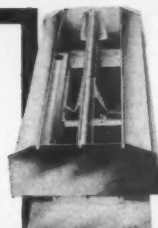
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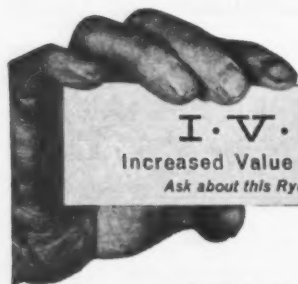
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WESTERN INDUSTRY/JULY 1959



## SPACE AGE PRODUCTION on the X-15

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U.S. first manned space vehicle requires a new alloy—Inconel X—that demands new manufacturing techniques. Here are some of these advanced methods . . .

**T**HE ROCKET SHIP X-15, America's first manned space vehicle, made a swift, smooth glide from 38,000 ft. to a perfect landing on a dry lake bed in the Mojave Desert recently, marking a giant step forward in manufacturing techniques developed in the West.

As the plane slithered to a stop, North American Aviation engineers immediately began speculating what will happen when—powered by a rocket motor—the X-15 is flown at 4,000 mph. to a height of 100 miles.

Problems inherent in such a trip include temperatures—extreme high and extreme low—occurring simultaneously in various sections of the plane, which have never previously been experienced in flight.

In planning the manufacturing of the X-15, a material which could withstand temperatures ranging from 1200 deg. F. to minus 3000 deg. F. was known to have been produced by the International Nickel Co. But this steel alloy—Inconel X—required brand new fabrication techniques for actual production use.

For example, although Inconel X was considered a weldable alloy no detailed experience of welding aircraft structures with it was available.

Research resulted not only in the development of unique and specific techniques of making structural and leakproof welds, but also developed a vast array of specialized welding and handling equipment. Once made the welds had to be proven. Consequently, all structural welds were X-rayed to make sure they met specification requirements.

Special techniques for contouring skins were developed involving the use of hot machining, cold machining, ovens, freezers, cutters, slicers, and rollers . . . all of them applied to new methods and renovated variations of proven techniques.

Some of the devices were surprising.

One special tool fixture needed for the control of contour during the heat treat cycle of a wing skin, for example, weighs 4300 lb.; the skin it holds weighs 180 lb.

In addition, extensive research went into the field of brazing with the new metal. In one instance, the company marked a milestone in the advancement of aircraft "plumbing"; this was in the development of a brazed sleeve tubing joint, necessitated by the extreme reliability requirements.

The difficult job is now accomplished with a relatively simple arrangement of an electrical resistance clamshell holding tool which permits brazing the sleeves while in place. Torch and induction methods are also used in some applications.

Despite the fact that the X-15 will wear a complete external armor of Inconel X, other metals are also used.

A primary structure of titanium and stainless steel will meet any heat that soaks through the nickel alloy outer covering. Aluminum, the old standby in the aviation industry, is used internally where high heat and high loads are not a problem. About 65% of the X-15



*THE X-15 ready for flight. The space vehicle can fly at 4,000 mph. to a height of 100 miles. Read how problems of heat and stress were solved in production.*

is welded structure, 35% fastened, compared to 100% fastened for current operational aircraft.

Auxiliary power units to run generators and hydraulic pumps presented a problem because of the extreme temperature ranges expected. Hydrogen peroxide, a catalyst and a turbine, were selected as the power source. But it took a vast amount of research and experimentation to find the special, reliable plastic compounds for the flexible bladders within the pressure vessels required for the hydrogen peroxide.

The pressure vessels themselves required extremely strong construction because of the tremendous pressure of the gases and fluids—in some cases up to 4000 psi.—they would contain.

A new hydraulic fluid that would flow in heat and cold had to be found to help steer the ship.

The fluid, known officially as Oronite High Temperature Hydraulic Fluid 8515, will actuate control surfaces of the X-15 as it hurtles upward toward outer space. Manufactured by the Oronite Chemical Co., the fluid is a synthesized silicate ester.

Temperature-wise, it takes up where petroleum-based hydraulic fluids leave off. While ordinary fluids tend to sludge at around 250 deg. F., the chemically based 8515 fluid will perform at temperatures well over 450 deg. F., and as low as 65 deg. below zero.

As the X-15 rips through the atmosphere its wings will glow with some 1,200 deg. of friction heat, and even with baffling and insulation, internal temperatures of over 450 deg. F. may be encountered. In order for the ship to have necessary control surface response, its hydraulic system was designed to operate at a pressure of several thousand pounds per sq. in.

Selecting the proper fluid to drive this system involved other considerations beside pressure and temperature.

The fluid must have a high viscosity index (small change in viscosity over a wide temperature range). It is important that the fluid be sufficiently viscous at elevated temperatures, otherwise there would be a risk of pump failure due to insufficient lubrication and system leakage. On the other hand, it cannot be too viscous at low temperatures or the system will become sluggish.

Low vapor pressure is another requirement. If the vapor pressure is too high, it can create troublesome vapor pockets in the hydraulic system. It may also produce excessive evaporation, which in turn leads to lubricating problems at external locations such as piston rod packings.

The 8515 fluid meets all these rigid requirements. Its base stock is a special type of silicate ester and thickening agents were added to improve viscosity. Other principal ingredients include oxidation and corrosion inhibitors, and a swelling agent to prevent leakage around gaskets and seals at extreme temperatures.

Other manufacturing problems included finding O-rings to hold fluids and gases within high pressure and temperature ranges . . . a cleaning process to get vessels and lines surgically clean before anything was put into them required hundreds of combinations of cleaning mixtures before finding the one that does the job.

These and scores of other items, some unique, some common, took painstaking experimentation to readjust the art of airplane building in light of the X-15's pioneering missions of the future.

## HEART AND MUSCLES of the X-15

Eight major sub-systems and components make up the vital parts of the X-15. Many of them are radical departures from conventional equipment . . .

**E**IGHT MAJOR SUB-SYSTEMS and components make up the heart and muscles of the X-15 high altitude research airplane. They are engine, propellant system, primary flight controls, auxiliary power units, ballistic control rockets, landing gear, and air conditioning and pressurization system.

The basic engine, manufactured by Reaction Motors, a division of the Thiokol Chemical Corp., New Jersey, will develop more than 50,000 lb. of thrust, shooting the plane at a speed of 4,000 mph. to an altitude of 100 miles.

Propellant for the engine is liquid oxygen combined with liquid ammonia, which is fed by a pressure system causing flow in excess of 10,000 lb. per minute. For comparison, the rate of fuel flow in a modern jet fighter with afterburner, such as the F-100, is from 30,000 to 40,000 lb. per hour. Thus the X-15 will consume propellants approximately 20 times as fast. Decomposed hydrogen peroxide provides a high-temperature gas used to drive a turbine pump to boost the propellant to manifold pressure. Helium gas is used for tank pressurization and liquid expulsion.

The X-15 hydraulic system powering the horizontal and vertical tail control surfaces, the speed brakes, and the landing flaps consists of two complete and separate 3000 psi. systems operating in parallel. The hydraulic system is driven by a new "piggy-back" combination of pumps.

Primary flight controls are designed to accommodate increased surface loads, high G forces, and high operating temperatures. Reaching extreme altitudes, where

the air is too thin for normal controls to work, the X-15's controllability will be dependent upon hydrogen peroxide thrust units (ballistic control rockets), located in the nose and wingtips.

These work by moving the airplane opposite to the force of the jet streams of the gas. Pitch and yaw is controlled by the nose jets, roll in the wingtips. Actuated from a specially designed three-axis control in the pilot's compartment, they will enable him to maintain the proper flight altitude during the ship's trajectory through the thin air.

Electrical and hydraulic power is supplied by two auxiliary power units, developed by General Electric, which operate in parallel. Hydrogen peroxide is used for their fuel. Use of the two units insures reliability of performance in electrical and hydraulic systems.

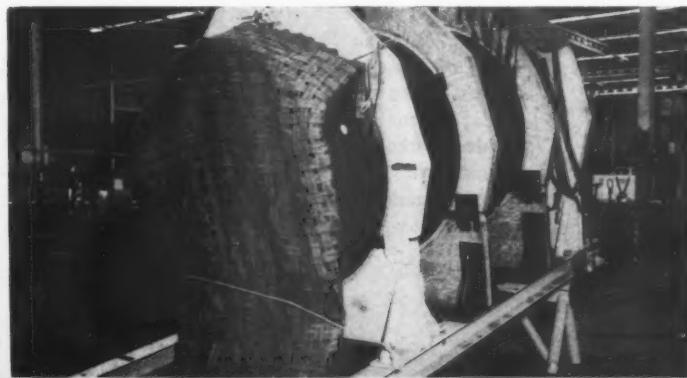
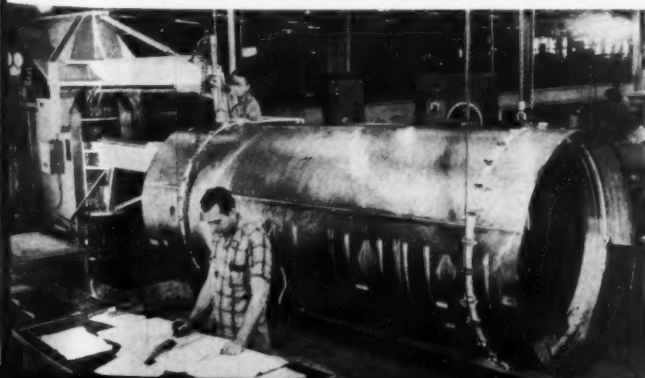
Landing gear departs from the conventional by use of two metal skids located on the aft section below the horizontal stabilizers. Dual nose wheels are also utilized to give directional stability during high speed landing (about 185 mph.). Both landing skids and the nose wheel are manually retractable into the fuselage for flight, and are extended by a mechanical means which utilizes gravity and the air stream.

Liquid nitrogen is utilized for the X-15 conditioning and pressurization system. Featuring a unique design and use of newly developed insulating materials, the pilot and delicate instruments are protected against extreme temperatures anticipated by this cooling system which weighs only 150 lb. and has a cooling capacity of 27,000 Btu.

**NEXT MONTH** — Tungsten inert gas welding of Inconel and Inconel X for the X-15

**BIG WELD**—X-15 fuel cylinder of Inconel X is welded using new techniques, developed during manufacture. Read next month's issue for a complete description of the tungsten inert gas welding.

**HYDROSTATIC TEST** of liquid oxygen. Water used was purified to prevent contamination of the tank. Note the net used as a safety precaution and the wood holding fixture.



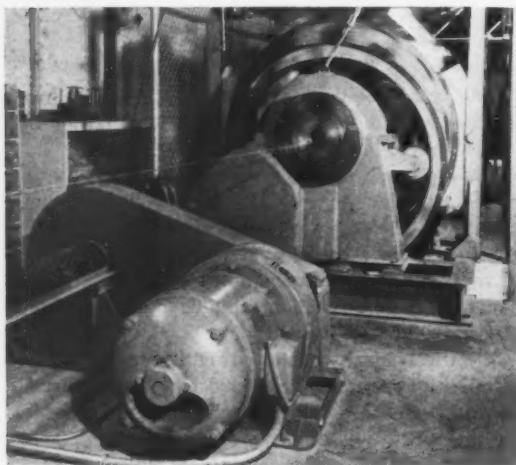


## MAINTENANCE CUT on power units

Using electronically controlled variable speed motors . . .

**M**AINTENANCE COSTS have been reduced 90% at the Gavitt Wire and Cable Co., Escondido, Calif., by turning to the use of special electronically controlled variable speed AC drive motors.

The company previously used a series of constant



speed motors or vari-sheave pulleys . . . but found that limitations in the size of wire which can be cabled, as well as the quantity, were being imposed upon them because of the lack of speed range.

Advantages of the variable speed motors, manufactured by the Louis Allis Co., were that various sized cable could be bound by simple variations in speed of the motor driving the binding unit.

In addition, the variable speed units were found to be better able to withstand the shock of changes in motor speeds. Starting a motor from a standstill and jumping it into high speed immediately can have a wearing effect on the drive mechanisms, unless, as in the case of the Louis Allis units, provisions for preventing such shock are made.

It is here that 90% savings in maintenance have been achieved. Previously, costs of overhauling the motors down from shock due to rapid speed changes, were a real operating headache.

*SPECIAL AC DRIVE MOTORS have increased speed in feeding cables, resulting in increased flexibility in winding at Gavitt Co.*

## SOLVING LIFTING of flexible tubes

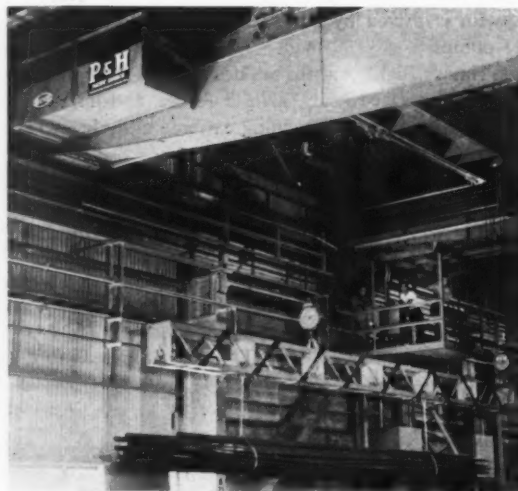
50-ft. lifting bar was attached to overhead crane . . .

**L**IFTING FLEXIBLE TUBE presents a problem. When the American Brass Co., Paramount, Calif., installed an overhead crane manufactured by the Harnischfeger Corp., it was necessary for some means to be devised whereby 50-ft. lengths of tube could be lifted onto and off work benches without bending, scratching or otherwise distorting the shape of the tube.

The solution came in the form of a 50-ft. lifting bar attached to two hooks hanging from the overhead crane. At the touch of a button in the operator's cab, the two crane hooks attached to either end of the lift bar are raised or lowered in perfect uniformity, so that the 50-ft. bar remains in a constant horizontal.

Attached to the lift bar by wire rope, the tube can be handled without damage of any kind . . . and can be lifted on or off benches or transported the full length of the shop to be stored in horizontal racks.

Each crane hook is provided with a safety handle welded to the hook. Gears on the overhead unit are enclosed to retain lubricants, with gasketed construction and spring-backed neoprene oil seals used wherever adaptable.



*50-FT CARRIER BAR attached to overhead crane lifts 50-ft. lengths of tubing without bending or distorting tubes in any way.*



## ALUMINUM DESIGN

### savings in fabricating

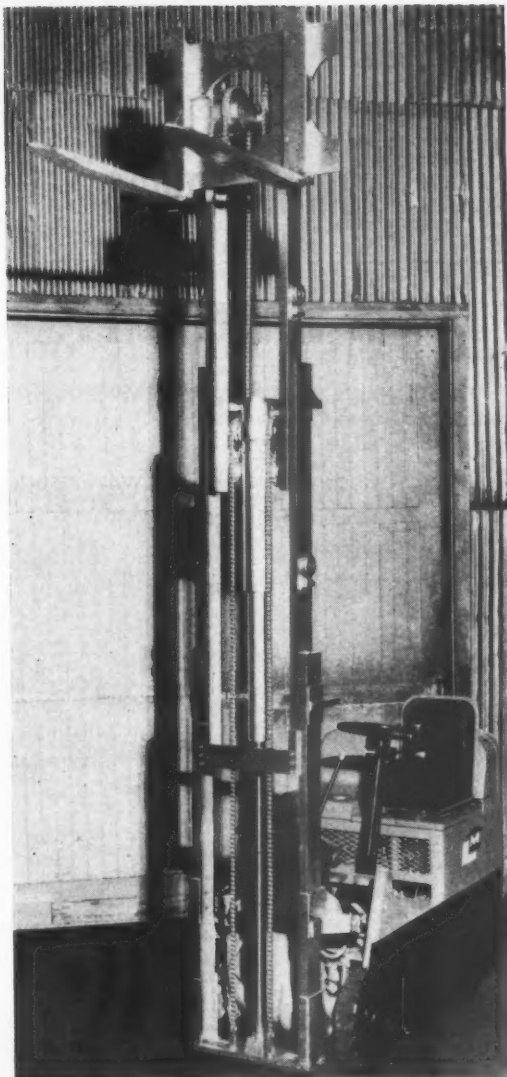
A Western firm has pioneered the use of aluminum in making its masts, uprights and carriage assembly . . .

**A**NOTHER FIRST has been chalked up by aluminum and the West. This time a Western manufacturer of fork lift trucks is making its masts, uprights and carriage assembly out of aluminum — for the first time in the industry.

By using aluminum, Lamson Mobilift, Portland, Ore., is not only saving time and money in fabricating, but it will be able to increase the maneuverability of its trucks.

The first Lamson fork lift with aluminum mast assembly was exhibited last month at the Material Handling Institute show in Cleveland. Now Lamson is planning full production of trucks with this mast. Here are the advantages the firm is planning to realize from the use of this lightweight material:

1. *Fabrication*—When using steel, the mast is made out of three pieces placed in a jig and welded into one channel. But now, the mast will come to the factory in one extruded piece, requiring only minor finishing work.
2. *Assembly*—All sections of the old mast were welded together. If repairs had to be made either a new mast was necessary or the section had to be cut out and repaired by extensive welding. Now, all parts are bolted together. Sections can be unbolted and a new part rebolted into place.
3. *Weight*—By using aluminum, the company will save about 35% in weight. This could mean that a standard truck would now have about 200 to 300 lb. extra carrying capacity. But the main advantage, Lamson plans, is that it will be able to take weight off the fork lift itself by making it shorter . . . thereby increasing its maneuverability.
4. *The mast reach*. Formerly, the mast was in three sections, the top part ahead of the rest. This resulted in limited reach and working ability. This new mast is a Triplex mast, with the third member within the



*TRIPLEX MAST on Lamson fork lift is made of aluminum. Mast is bolted instead of welding, saving time in fabricating. Light weight of aluminum will mean a saving about 35% in weight. This would enable Lamson to shorten length of truck and increase maneuverability.*

mast, not ahead of it. And the reach has been extended to 191 in., considerably more than the old mast.

So score up another first for aluminum — and the West.

## PORTABLE TOOLS

### for intricate work . . .

Drilling, grinding flexibility was needed in fabricating first daily monorail train in U.S. . . .

**P**ORTABLE POWER TOOLS played a vital part in construction of the first monorail trains to operate on a daily basis in the United States.

Now travelling over the Disneyland-Alweg system in Anaheim, Calif., the ultra-modern trains, each with a capacity of 82 passengers, are designed to demonstrate the practicability of monorails as a solution to mass transportation problems in American cities.

Electrically operated and running on rubber tires, the trains travel over a concrete beamway supported by cement pylons reaching up to a height of 34 ft. In building the coaches, it was vital that precision tolerances be met to ensure perfect safety in operation.

At Standard Carriage Works in Los Angeles, where the coaches were built, flexibility in operating drilling and grinding units was necessary because of the intricate framework. The company found that ruggedly powered 1/4-in. heavy-duty drills and heavy-duty grinders manufactured by the Milwaukee Electric Tool Corp., more than met the precision tasks to which they were set.

The sander-grinder, with a high speed of 5000 rpm., was especially effective because of its easy-to-change discs—which can be removed by simply pressing a spindle lock button and eliminates need for wrenches. The split handle design of the grinder affords easy access to the dust-proof trigger switch and electrical connection, while a specially designed cord clamp securely grips the cord, preventing pull-out and breaks.

*PORTABLE POWER TOOLS—drillers and grinders—are used on intricate framework for monorail train that will run to Disneyland. Grinder at right has a high speed of 5,000 rpm.; simple button removes discs for changing.*



## WELD JOINT EFFICIENCY of 100%

Aircraft firm uses new weld roll planishing machine . . .

**O**NE OF THE NEWEST weld roll planishing machines built for industry is now in use at the Marquardt Aircraft Corp. plant in Ogden, Utah . . . to achieve 100% weld joints.

The machine has a 72-in. throat with a 6½-ton maximum planishing pressure. The upper and lower rolls may be swiveled so that circumferential as well as longitudinal roll planishing may be carried out at speeds up to 105 in. per minute. Maximum diameter of cylinders or hemispheres that may be planished is 36 in., with a thickness range of 0.010-in. to 3/16 in.

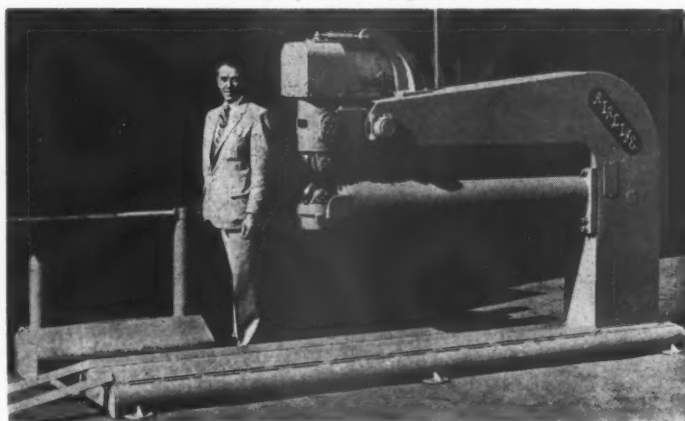
A small diameter cart assembly (shown to the left and rear of the machine in the picture), with a 36-in. work space length, may be substituted for the lower arm of the planisher so that tubes as small as 3 in. in diameter can be accepted by the planisher.

Roll planishing is a continuous, localized and controllable cold working process, almost identical with the manner wrought sheet is manufactured—by continuously rolling cast billets into strong, ductile sheet stock. Roll planishing is used at Marquardt to continuously roll cast weld structures into smooth, level, stress-relieved weld joints. Resulting weld joint efficiency is 100% as opposed to 80-90% for unplanished welds.

To operate the planisher, manufactured by Airline

Welding & Engineering, the weld joint is placed between the rolls, a foot pedal is actuated, and the upper roll moves downward to contact the top of the weld. After pressure is applied, the upper roll begins rotating at a constant speed, compressing and continuously "peening" the area. Multiple passes may be made.

*BYRON RUSSELL, President of Airline Welding & Engineering Co., poses with welder his firm supplied to Marquardt Aircraft plant in Ogden, Utah.*



## WIDEST COLD-ROLL forming mill in U. S.

Washington plant installs unique product forming line . . .

**A** COMPLETE PRODUCTION LINE, featuring the widest cold-roll forming mill in the country, has been installed at the Trentwood, Wash., plant of Kaiser Aluminum & Chemical Corp.

The complete line is 155 ft. long, weighs over 60,000 lb., and has a capability of forming building products continuously from coiled aluminum at 150 fpm.

The production line and mill handles coils of aluminum five ft. wide and weighing about three tons. Coils are loaded on a reel and automatically fed onto a conveyor table where they are continuously cut to desired length.

Cut sheet is conveyed into the 24-stand cold-rolling mill where roller dies progressively form the sheet into the desired configuration. The finished product is then stacked and packaged at the exit end of the mill, ready for shipment.

The production line was built by the Aluminum Supply Co. of Spokane, Wash., which operated a pilot line for over a year before beginning construction on this project.



# MATERIAL HANDLING—Tomorrow's solutions of today's problems

The winner of the annual Clark-AMHS award is a Westerner! Here he tells of advanced material handling techniques on an Hawaiian sugar plantation . . .

**By C. J. Rockstead**  
Chief Development & Systems Engineer  
Hawaii Commercial & Sugar Co., Ltd.  
Puunene, Maui, Hawaii

**T**OMORROW'S SOLUTIONS for today's problems of paying tomorrow's wages today, is the only way that the Hawaiian sugar industry can possibly survive. Average daily cash earnings plus fringe benefits of medical care, low cost insurance, vacation pay, sick pay and pensions averaged \$16.62 per day for each of Hawaii's sugar workers in 1957.

An aggressive program of mechanization during the past quarter of a century, which has reduced the number of employees from over 50,000 to the present 17,000, has managed to keep the industry barely solvent. Recently negotiated labor contracts will add almost 10% to payroll costs each year for the next two years. These are additional costs in the face of a historical record of increased productivity averaging less than 5% per year. Obviously the situation is acute.

We, at the Hawaiian Commercial & Sugar Co., Ltd., on the Island of Maui, which is not only the largest sugar cane plantation in Hawaii, but the largest under the American flag, have long felt that the principles of material handling have a large application in our operation. The application of material handling principles to the sugar industry has and will produce spectacular cost reductions. Proof of past gains is apparent when one views the handling and loading of bulk sugar and the continuous flow of juice through liming, clarifiers and evaporators at the mill.

Future potentials can best be pointed out by the statement that sugar from seed cane to raw crystal form is subjected to approximately 118 handlings of which only 18 to 22 are production handlings. Another comparison generally used by mainland industries is to express it in ton handlings. That is, each time a ton of raw material or component is handled in the process of producing a product to its final form and place of shipment, the record shows "one ton handling." Thus we note that the steel industry averages 185 ton handlings in producing a ton of steel, which makes them most material handling minded.

In dramatic contrast, the irrigated cane sugar plantation shows over 2,300 ton handlings per ton of raw sugar produced! The effect of material handling practices cannot help but be startling in this fertile field.

The production of sugar by photosynthesis in the

cane plant makes in effect each plant a factory for the manufacture of sucrose . . . and we have to bring to each of these little factories the necessary raw materials of plant food and water.

With 28,000 acres of sugar cane, we have over 1,000,000,000 of these individual factories to keep supplied during its two years growing period.

Water is the plant's greatest requirement. Approximately 2,000 tons of water are required to produce one ton of sugar. HC&S Co.'s daily water needs exceed that of a mainland city of over 1,000,000 population. About half of this 140,000,000,000 gallons a year total is brought in by a ditch system some 20 miles from the windward side of the island. The balance is pumped from numerous wells located on the plantation. All is delivered to the cane plant by the first principle of material handling — "continuous flow, gravity powered."

Because we have seen this for so long, we fail to recognize the material handling significance of what we see. Consider the substitution of 5,000 gallon truck tankers for bringing in the water now coming from the rainy side of the island. If they were to operate 24 hours per day and every day of the year, this plantation would require, without provision for spares, 6,500 such trucks and semi-trailers with drivers. The cost of delivering the water would be 700 times greater than the present method.

Plant food, the second largest requirement consisting of over 25,000,000 pounds of liquid fertilizer per year, is now applied by the same low cost principle

*TWO TOTE BINS of seed are handled at one time into the treating tank by a fork lift equipped with a hydraulic scale and side shifter.*





of continuous flow—through the irrigation water. A tremendous difference from the days of transporting granular material into the fields by tractor and horse-back.

At the time of harvest the dried leaves of the cane plant, called opala, which have collected during the two years of growth, constitute about one-third of the weight of the cane. This 35 to 50 tons of dry fibrous material greatly increases the cost of harvesting and hauling to the mills. It is removed by the most spectacular material handling medium of all—fire. The cane plant consisting of 13% fibre and 87% juice is not harmed by the flames.

The evolutionary technological progress in methods on sugar plantations has inadvertently resulted in progress in handling. However, faster and more profitable results can be obtained by looking at the operation only in the light of material handling.

An example of this approach is in the handling of seed (pieces of cane approximately 20 in. long) from the seed field through fungicidal treatment to placement in the ground of the plant field. Cutting the seed into tote bins, each carrying an average of 2400 lbs., allows loading by lift units onto semi-trailers carrying eight boxes each. Unloading at a central treating station where the seed is given a 20-30 min. dip in a hot fungicide is accomplished by use of a 16,000 lb. capacity fork lift. This same unit also places and removes the bins from the bath and reloads them on the trailers.

A hydraulic scale on the fork lift weighs the bins for means of computing incentive pay for the seed cutters. One man operates the treating station and handles the plantation's daily requirements of over 200,000 lb. of seed in one eight-hour shift.

The treated seed is removed from the trailers in the plant field and dumped into the planting machines with a front end bucket loader with bucket removed. Delay to planter due to loading is approximately  $\frac{3}{4}$  of a minute. The dumping action of the front end loader allows the use of tote bins with flat bottoms, increasing cube 15% from a slope bottom tote bin, necessary when a standard fork lift is used, because of the limited forward tilt.

A modified swing shift attachment adapted to the

*A FRONT END BUCKET LOAD scoops up bagasse to place on conveyor. Belt takes it to boilers where it is used for fuel.*



*THE AUTHOR (right) talks with another Westerner—John J. Allen, Undersecretary of Commerce for Transportation, at AMHS award banquet. Prize was \$2,000.*

front end loader allows accurate placement of the bins with a minimum amount of maneuvering of the tractor. Other bucket loaders of the wheel type find wide use around the plantation for handling bulk materials such as bagasse. The same unit with a rock fork permits the screening and loading of thousands of tons of rocks from our fields at a cost reduction of 80% from the previous bulldozer-stoneboat-crane method.

Many other examples can be given, such as the application of 2,125,000 gallons of weed killing herbicides applied by tank spray and the ever efficient airplane. Combining functions of production and material handling operations, such as the bins attached to the tractor used for plowing irrigation ditches which at the same time carry the short irrigation pipes used to let water from the ditch to each cane furrow, and the opala used for making check dams, results in cost reductions.

It is, however, in the harvesting and hauling to the mill of the mature cane that one of the largest materials handling operations exists. HC&S Co., Ltd. annually loads and transports to its two sugar mills some 1,500,000 tons of cane and adhering trash.

After the cane is pushed into windrows by especially designed rakes on D-7 size tractors, the cane is loaded by cranes into 50-ft. semi-trailers pulled by 300 hp. tractive units. Methods and incentives have developed rather outstanding production rates—40 tons loaded into a unit in less than ten minutes. Twenty hauling units operating around the clock bring in 12,000 tons each 24 hours for processing at the mills. A rail-mounted crane at the mill, lifting the chain net from the hauling unit, discharges the 40-ton load in less than a minute onto a live conveyor table feeding a cross conveyor carrying the cane into the washer and cleaner.

In spite of the degree of efficiency that our present operation has developed, we could not forget that it is only today's solution . . . and if we are obligated to pay tomorrow's wages we must apply tomorrow's solutions to today's operation, to remain solvent. A close



**FAST ACTION**—Loading cranes complete 40 ton load into hauling vans in less than 10 minutes per load.

analytical look at our harvesting operation indicated that after the cane was cut from the stool, the operation primarily become one of material handling in moving the 1,500,000 tons of material from the fields to the mills for processing. As a material handling problem, it was deemed practical to apply the best principles of material handling techniques for solution. The constant example of tons of water and fertilizer handled at a minimum cost by gravity powered, continuous flow could not be ignored. A look into the various means of obtaining continuous flow handling of the harvested cane indicated that pumping cane through a pipe line would have the greatest merit, if it could be achieved.

Transportation under pressure, over long distances, of gaseous and liquid materials through pipe lines has long been accepted as a distinct and major form of transportation. Of somewhat more recent origin is the movement of solids in this same manner. Although records show that the founder of the New York Steam Corp., Wallace C. Andrews, transported a slurry of coal and water through a pipe line in 1899, it has only been during the last few years that long distance installations have been installed to transport coal, gilsonite, limestone and metal bearing ores. The economics of long distance pipe line transportation, particularly in the petroleum field, are so firmly established that during 1956 more volume of material was transported through the 194,000 miles of pipe lines on the mainland than by all the other forms of transportation—rail, air, truck, and water.

#### Piping test loop

A search of the literature indicated no work had been done regarding the pumping of a slurry of fibrous material. We constructed a 1,000-ft. test loop of 10 in. ID aluminum pipe with surge tank and a solids type pump. The test program was set up to explore only the problem at hand and no attempt was made to conduct a research program to establish general relationships for all the variables involved. Parameters were determined, however, to show the interrelationship of friction, flow velocity, slurry concentration, initial size gradation, degradation in the line, pipe di-

ameter, corrosion, erosion, temperature, ph range, and the use of chemical bacteriacides.

Many questions were answered by a season's operation of the test loop; the most important being that it was possible to pump a heavy thixotropic slurry of fibrous organic matter. Although slurry concentrations of greater than 50% cane by weight to liquid were successfully pumped it was determined that 35% was a practical figure. Velocities over 4 ft. per sec. provided plug free operation. Piece size was best determined to be 2 in. or less.

#### Economic evaluation of test

Economic evaluations projected from data secured from the test loop indicate the following could be achieved:

- A—Costs of handling the cane by pipe line from the field to the mill including depreciation on both systems would be about 1/3 of our present method.
- B—Sugar cane being an organic material is subject to rapid deterioration beginning at the time the plant is killed, and rapidly multiplying during the time interval between field and mill. This deterioration, plus mechanical damage to the cane stalk by our present method, results in the loss of some 20,000 tons of sugar annually. The proposed pipe line with its shorter time interval and the fact that the cane pieces would be quickly contained in a sterile liquid would drastically reduce these losses. A conservative estimate would be \$1,000,000 worth of sugar saved a year.
- C—Due to the fact that the milling of cane is a diminutival process, small pieces of cane attrited by the turbulence in the pipe line and in an osmotic relation with the carrying liquid are actually partially milled while being transported. Final milling of this well prepared, macerated pulpy cane will not only result in horsepower and operational savings, but also obtain a higher rate of extraction of the sucrose.
- D—Rate of deterioration is a function of piece size and time. In order to control it, the development of cane harvesters was limited to the principle of keeping the cane in as long a stalk as possible. The high degree of control afforded by the pipe line allows harvester design to follow considerably simpler principles of cutting in small pieces from the top down and not at the ground line. The large amounts of soil now adhering could be eliminated and consequently eliminate the costly cleaners and washers at the mill end.

There are many other, though smaller, areas of savings with the pipeline system and a conservative evaluation indicates an annual saving of \$2,500,000 to the Hawaiian Commercial & Sugar Co., Ltd. We are now installing a mile-long pilot line capable of delivering up to 100 tons of cane per hour to corroborate data secured from the test loop and to provide the necessary design data for a full scale installation.

Truly, materials handling, has again provided tomorrow's solution we so earnestly need for today's problem.

## ABRASIVE BLASTING

### unit uses centrifugal force...

Simple device saves on air equipment, horsepower needed for air pressure. Used for pickling . . .

**A** SIMPLE MECHANICAL UNIT that utilizes controlled centrifugal force instead of compressed air for abrasive blasting is scheduled for use in Pacific Tube Co.'s new plant which will start operating in the fall of 1959.

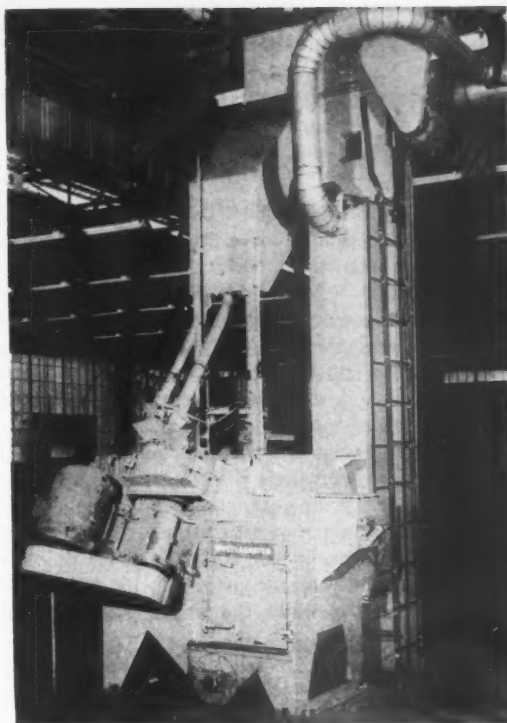
The unit, which will be used in place of the standard pickling operation, is completely airless, which means not only the elimination of costly air pressure equipment, but also tremendous savings in horsepower otherwise necessary for generating air pressure.

Manufactured by the Wheelabrator Corp., the unit will be set in a straight-line production setup with rod being uncoiled, passing through a straightener, before entering the wheelabrator. After abrasive blasting the rod will be automatically drawn and cut. There will be no waste acid disposal problem as in the case in standard pickling operations.

In the wheelabrator process, abrasive from an overhead storage hopper is fed to the center of the wheel unit, from which it is hurled upon the work to be cleaned. The wheel, rotating at high speed, throws the abrasive by centrifugal force.

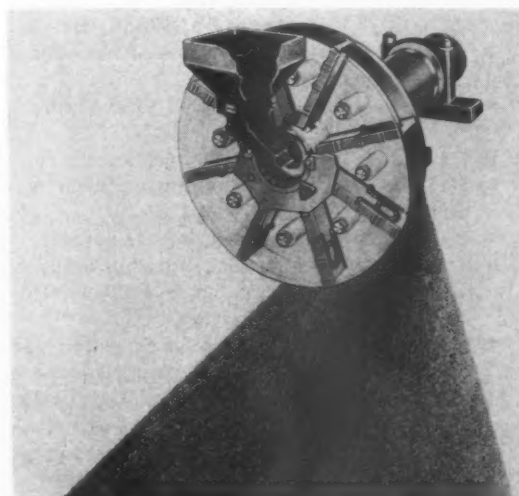
A cast alloy impeller rotates the wheel and carries the abrasive to an opening in the stationary control cage where it discharges to the bladed section of the wheel. At this point the abrasive is picked up by the inner ends of the throwing blades, which are gradually rotated to develop a throwing velocity resulting from radial and tangential forces.

This means the blast utilizes all the power supplies by the wheelabrator, and change in direction of the abrasive is obtained by a control which turns the control cage—which in turn changes the position of the opening.



*PICTURED ABOVE is the new blast cleaning unit that will be installed at Pacific Tube. It will enable continuous-flow cleaning of rod and bar stock. Coating and cold drawing can be provided in a continuous operation.*

*CUTAWAY BELOW shows the centrifugal force principle. Steel abrasive is fed from an overhead storage hopper to the center of a rapidly rotating bladed wheel, where it is hurled against metal surface.*



## TIME REDUCED in complex manufacturing

Special hydraulic controls on milling machine . . .

**T**IME HAS BEEN REDUCED from 24 hr. to 30 min. in the production of complex multi-bladed turbine wheels at the Boeing Industrial Products Div., Seattle.

These inducer wheels, used in the Boeing 502 series of gas turbine in marine, military, and industrial applications, are set into the front of the engines to guide air into the compressor. This is accomplished by high-speed rotation of specially shaped blades.

Production formerly required a double process: One step to produce the wheels with flat blades; a second time-consuming process to attain the complex and slightly-curved blade shapes necessary.

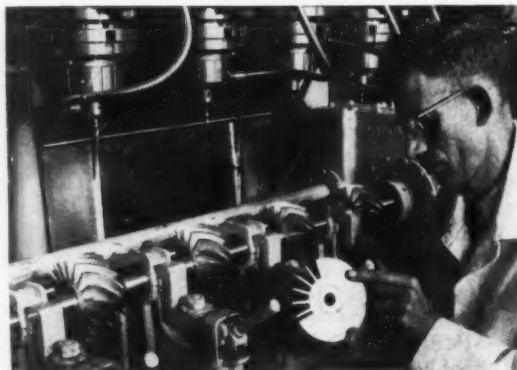
Boeing tool engineer Sam Ross solved the problem by adding special hydraulic controls to the self-guided milling machine on which the wheels are completed in one operation.

Ordinarily the standard self-guided milling machine operates in three axes—cutting horizontally, vertically and in depth. Ross's system adds a fourth axis—a rotational feature which permitted changing the angle of the inducer blades while being milled.

The milling machine, turning out four wheels simul-

taneously, completes the job in half an hour per part. The saving will be reflected in costs of the engine, now being produced at Boeing.

*SAM ROSS holds partially milled turbine inducer blank indicating complex milling job required. Special controls stepped up production 40 times.*



## EFFICIENT ANSWER to close-quarter loading

Motorized pry-bar lifts big in small space . . .

**A**N EFFICIENT ANSWER to close quarter load-handling problems has been found by United Airlines which now uses a motorized pry-bar for facilitating loading of awkward-sized objects inside cramped airplane fuselages.

Advantages of the Tug-Bar, which has a rated capacity of 4,000 lb. and a thrust of 1,900 lb., are:

- It can be used anywhere there is room for a man to stand.
- One man can move up to two tons, placing it exactly where required.
- It has push button control which enables 'jogging' the load and resulting in maximum maneuverability.
- It weighs only 110 lb., so it is quite portable.
- The Tug-Bar skids the load instead of lifting it, maintaining weight distribution and low floor loading (important on aircraft).
- The unit requires hardly any maintenance, and motors in it are wound for all standard voltages.

Manufactured by Western Gear Corp., the Tug-Bar is an ideal companion for fork lift trucks as well as being ideal for use where fork lift trucks cannot operate.



*TUG-BAR is shown lifting a heavy crate in cramped quarters. It can operate anywhere there is room for a man to stand.*



## 50-TON GANTRY

### for drilling, reaming...

Giant, new hydraulically operated unit is faster, easier than conventional apparatus...

**H**UGE PIECES OF STRUCTURAL STEEL are being drilled by a giant new hydraulically operated drilling and reaming gantry—and although the unit weighs 50 tons, it has proved faster and easier to operate than conventional reaming apparatus.

Designed, engineered and built entirely within the plant, the hydraulically-powered, four-headed drilling and reaming gantry has been installed in the structural fabrication shop of the Maywood plant of United States Steel's Consolidated Western Steel Division in Los Angeles.

In daily use on heavy production work since its

installation several months ago, the gantry, through its maneuverability and compactness, has proved itself to be substantially faster and easier to operate than more conventional-type drilling and reaming apparatus, according to M. P. Klick, chief engineer.

Major job of the big gantry is to drill rivet and bolt holes in columns, beams and other large structural pieces under fabrication at this division of U. S. Steel, which is one of the nation's leading designers, fabricators and erectors of wind tunnels, tanks, kilns, large diameter pipe and other structural steel projects.

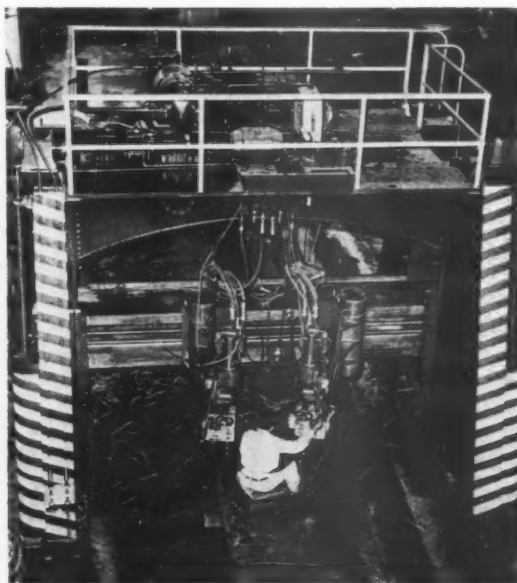
Equipped with four drill heads mounted in pairs on arms extending from each side of a cross rail, the machine is capable of simultaneously drilling laterally spaced twin holes at any point within a range of 11¼ in. and 12 ft. 4 in., the minimum and maximum settings of the drill heads.

Spindle drive for each drill is provided by a vane-type hydraulic motor on the drill head powered by a variable displacement hydraulic pump on a deck atop the gantry. The hydraulic spindle feed has a 12 in. stroke, with a dual vane pump providing oil, coolant, head-lock and other services.

The drill heads, which are designed for a maximum 1½ in. drill size, are mounted on steel arms attached to an 11-ton cross rail installed horizontally between twin 15 ft. upright columns of the gantry carriage. Mounted on steel rails of 15½ ft. width with a net travel of 115 ft., the carriage is self-powered by a travel drive, enabling the drilling and reaming gantry to move along large structural pieces and complete its operation without moving the work.

Power for vertical travel is generated through a 480-volt, 3-phase motor mounted beside the hydraulic pumps on the top deck of the 17 ft., 7 in. carriage. Power is fed from an overhead rail paralleling the gantry's base tracks.

*USED FOR MULTIPLE drilling and reaming of large beams, girders, etc., the machine was built by Consolidated Western. Mounted on steel tracks, the gantry is self-powered by a travel drive, enabling the drilling and reaming operation to move over large structural pieces and complete the job without moving the work.*



## LEAK DETECTION

### for hermetically sealed units . . .

Involves use of radioactive gas; is fast, simple, accurate . . .

**A** NEW LEAK DETECTION SYSTEM is being used by the Elgin Watch Co., Burbank, Calif., for testing hermetically sealed components, involving the use of radioactive gas.

Advantages of the new system are that it provides a test for component leakage after sealing operations are complete . . . components which fail when extremely small leaks occur can now be tested to 10 cc/sec. by development or production departments, assuring components will function even after long shelf life . . . tests are non-destructive and transistors which can't be used in missiles because of a very small leak, can be used for products with less critical specifications . . . and finally, bottlenecks in production due to testing are eliminated as thousands of components can be tested daily.

The Radiflo leak detection system is manufactured by American Electronics, Inc., and operates as follows:

Components are placed in an activating tank and the lid of the lead-lined tank is sealed. A non-toxic, radioactive gas (Radene III,) is pumped in to the desired activating pressure. Control of this pressurization is from an operator's panel where a rotary switch for operating pumps and valves is located. The gas, which is chemically inert, is allowed to enter the components through any existing leak, by the positive pressure differential which forces radioactive molecules from the gaseous atmosphere, through the leak and into the component.

After the required soak time, the gas is pumped back into its original holder and the tank completely evacuated. This phase of the operation assures most efficient utilization of all radioactive material, and assures recovery of gas not trapped by leaking components.

Next, an air wash is circulated over the components to remove radioactive material from external surfaces of the parts and the decontaminated waste air exhausted to the atmosphere outside the plant through a venting system.

Those components which leak will contain radioactive atoms, each of which resembles a tiny radio transmitter which sends a known amount of electromagnetic (gamma) radiation through the walls of the leaking component. Therefore, when each leaker is placed adjacent to a detecting and measuring device, the recorded intensity of radiation is an indication of the number of radioactive atoms which have leaked in.

When related to the controlled variables of the activating process, this accurately reveals the leak rate of the component tested. Once these variables are established for a given installation, direct readings of leak rates are possible.

On the other hand, a rejection leak rate can be noted and production workers can perform a single, go-no-go test. Handling time is in seconds. Labor and burden savings are substantial.

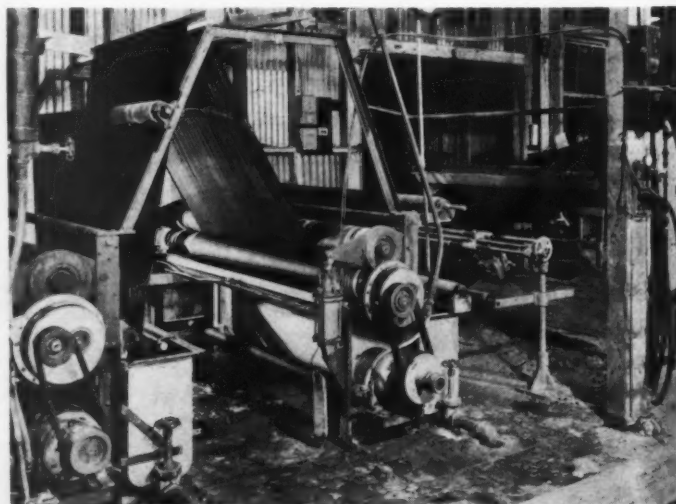
## Tension control

TENSION CONTROL is vital in a woolen mill to assure the smooth flow of cloth through the production process.

At Portland Woolen Mills, Inc., the problem of tension control on a soaper machine was solved by the use of two Falk 203J14 shaft mounted drives.

Both units are driven by 2 hp, 230 rpm gearmotors. On unit to the right in photo, note the combination of variable-pitch sheave, lever linkages and counter-weights used to control the tension of the cloth by varying the reducer output speed.

This setup was engineered by Kance Peden, Western Machinery Corp., Portland, and Clyde Wagner, chief engineer of Portland Woolen Mills.



## MATERIAL HANDLING on the production line

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Here are how conveyors . . . industrial trucks . . . feeders . . . racks, frames, bins . . . pumps . . . etc., have teamed up to speed production flow in Western plants . . .

**M**ATERIAL HANDLING ON THE PRODUCTION LINE can be one of the biggest headaches you can have.

Especially in the West, where plants are often of one-story, sprawling construction. This calls for efficient handling equipment running along long horizontal lines, rather than short vertical hauls as in Eastern multi-story plants.

And the changing nature of our plants—the fact that new ones are replacing old ones . . . plants are expanding . . . new products and methods are constantly being introduced — demands that material handling systems be extremely flexible.

Fortunately, there are many handling systems especially suited to Western plant operating conditions. Here are some of the more outstanding examples WESTERN INDUSTRY editors have selected after weeks of talking with men on the job. We're sure you'll find a system designed for your plant.

Some of the systems consist of:

### BELT CONVEYORS

Cut assembly costs by 50% . . .

Conveyor-belt handling sets a profitable pace in the assembly of precision potentiometers for the Helipot Div. of Beckman Instruments at its recently-constructed plant in Fullerton, Calif.

John Pamperin, division manufacturing manager, says the streamlined technique has cut assembly costs by approximately 50%. Currently used on certain potentiometer lines, the conveyor belt technique is steadily being extended to other products now assembled in batch fashion.

On a typical assembly line, a four-in. web belt carries potentiometers 80 ft. through 33 work stations. The belt starts with parts at one end of the bench and delivers finished "pots" at the other . . . each item labeled, inspected and ready for insertion in dust-proof bags prior to final packaging.

Mr. Pamperin cites five major advantages of the conveyor-belt system:

1. It paces the assembly operation, maintaining a smooth, predictable and easily controlled work flow.
2. It eliminates a host of individual transportation operations between work stations.
3. It permits optimum specialization of labor, allowing individual operators to concentrate on individual operations in contrast to the jack-of-all-trades requirements imposed on batch assembly operators.
4. It minimizes work in process, reducing work station space by a good 50% over the batch-type method.

5. It materially cuts assembly time, an important factor in a business where sales are often related to delivery time.

Refinements of the conveyor-belt system since

its installation have led to some profitable improvements in the assembly lines. Beckman Helipot engineers have developed tables with removable formica tops which facilitate interchange of bench fixtures. Themselves interchangeable, the tops can be moved easily, thus lending valuable flexibility to the entire assembly arrangement.

### Belt makes for clean operation in food plant . . .

Ease of cleaning belts at the Diamond Walnut Growers, Stockton, Calif., was a big factor in switching from cotton (plastic coated) belts to those made of Koroseal.

The walnut firm uses several thousand feet of the Koroseal belts to convey the walnut meat to grading tables and other production stations.

W. H. Libbey, chief engineer at the plant, explains that in one operation, a 70-ft. belt, 16 in. wide, carries shelled walnuts from storage bins to the grading tables. This is a brown Koroseal 3-ply belt with friction surface on one side only. A 1½ hp. gear head motor powers the belt with chain drive. The belt operates 10 hr. a day intermittently about 10 months of the year. The belt carries 8,000 lb. of shelled walnuts per hr.

A series of 4-ply Koroseal belts 42 in. wide and 10 ft. long used at the grading tables have friction surface on one side, are chain driven and powered by a ¾ hp. motor. They run continuously 15 hr. a day for about 10 months of the year. The belts are the moving tables for the final grading of the walnuts.

The belts are green—a color chosen over brown or amber because it causes less strain on the eyes for the graders and permits them to more effectively pick out shells or off-shade walnuts.

These belts are operated in the production building where temperature and humidity are controlled. The room is at normal temperature of about 75 deg. The belts are subjected only to the oil from the walnut kernel or meat. Mildew is no problem and there are no impact blows. The belts carry no materials with abrasive or cutting properties.

Koroseal belting is manufactured by the B. F. Goodrich Co.

### Stainless steel wire belt aids drying . . .

A stainless steel wire conveyor belt is improving

the dehydrating of fruits and vegetables in Western plants.

The steel conveyor belt forms a continuous moving trough that holds food while heated air is forced upwards through the wire mesh of the belt.

Eight of the new dryers are installed in plants in California and Washington to replace the old tray drying operations.

The belt consists of a special woven wire with chain-drive construction to virtually eliminate losses through the mesh, an important factor with small pieces. The belt permits free circulation of air, thus more efficient drying of the commodity it carries.

The new dryers reduce moisture content quickly and more uniformly, performing in about one hour dehydration which takes from four to five hours in the older method. The new drying technique gives better natural color and flavor in the product, and these qualities are better retained in storage. It also does away with problems of food sticking to wooden trays and entirely eliminates the problem of wood slivers caused by scraping dried food particles from the wooden trays.

Drying method was conceived in the Western Regional Research Laboratory of the U. S. Dept. of Agriculture; the belts were engineered at U. S. Steel's Cyclone Fence plant in Oakland, Calif.

## OTHER CONVEYORS

### Power-and-free, chain conveyors . . .

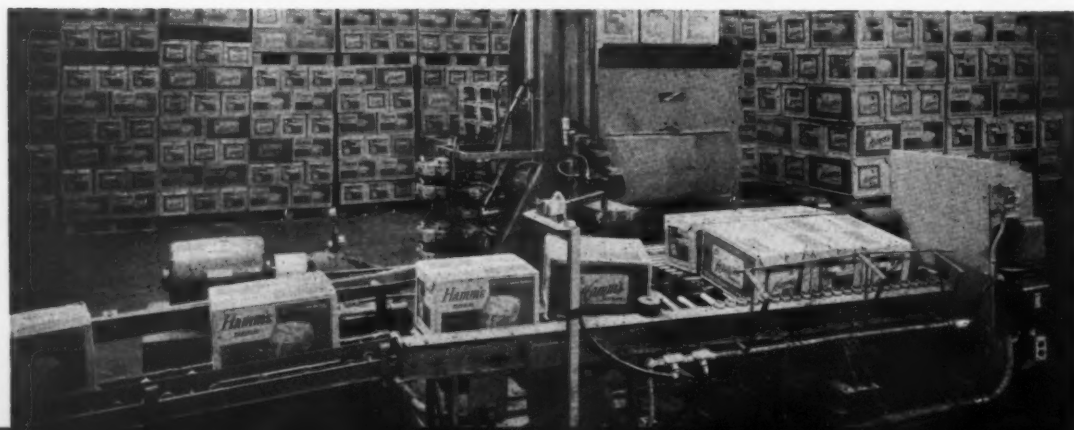
Power-and-free and chain conveyors are making possible the fast pace of Western automobile assembly plants.

For instance, two power-and-free conveyor systems, a floor conveyor and four trolley conveyors enable the Chrysler assembly plant in Los Angeles to be the only assembly plant in the country which makes four lines of cars in a single plant, all in one assembly line.

Because of the power-and-free conveyor system (power-and-free conveyors are a combination of powered trolley conveyors used to propel unpowered mono-rail-type load-carrying trolleys) the mix can be varied constantly, to produce the desired quantity of each body style to meet production requirements.

The main floor conveyor consists of Link-Belt 678

*CARTON UNSTACKER feeding cases to take-away conveyor. This unit, manufactured by Standard Conveyor Co., unstacks cartons or cases automatically, from unit loads received from connecting conveyor or fork lift truck*





heat-treated rivetless chain, with 62 sets of pushers and holdback dogs on 18-ft. centers. It travels in a rectangle, 492 x 70 ft., dipping into a pit for part of its course. It travels at speeds up to 20 fpm., thus completing a cycle in about 56 min.

The two power-and-free conveyors consist of Link-Belt 458 heat-treated rivetless chain with pushers on 20 ft. centers; 120 carriers, each hung from two 4-in. load trolleys; two Link-Belt floating caterpillar drives; eight manually operated switches; four automatic air-cylinder-operated bridge transfers operating on 6-in. trolleys; four manual storage transfers; and four storage areas.

### Automating an entire plating operation . . .

A flexible overhead conveyor installation has automated an entire plating operation for small television and electronic components—at a fraction of the cost of a customary automatic plating system.

At Hightower Plating and Mfg. Co., Los Angeles, electronic components are continuously processed through cleaning solutions, rinses, through a complete cadmium plating cycle and finally through a drying oven, conveyed by a Chainveyor system for continuous processing.

In the system any combination of turns is obtained by joining horizontal, vertical up, and vertical down curves together. The ability to negotiate 16-in. radius curves without traction wheels or roller turns and bulky supporting fixtures has made the system a most flexible one for Hightower. It has afforded continuous production between plating tanks with no intermediate handling.

A 6-in. radius idler sprocket assembly is employed in the Chainveyor system at Hightower. This makes it possible to parallel continuous power lines on 12-in. centers. They are used both horizontally and vertically—horizontally for conserving oven size or for drying lines, vertically for continuous processing through small dip, solution or plating lines as is the case at Hightower Plating, where it is possible to negotiate vertical turns on a 6-in. radius.

Thus the use of the special idler sprocket gets the load in and out of the tank as the electronic parts move from station to station in proper sequence.

The Chainveyor 1 5/8-in. OD tubular track and chain weighs 3 1/2 lb. per foot, yet has the ultimate strength and capacity comparable to heavier conveyor equipment. Loads are suspended on racks supported by pendants spaced on 6-in. centers with capacity up to 30 lb. per pendant.

## INDUSTRIAL TRUCKS

### Lift trucks used in production . . .

The use of lift trucks in the production of clay pipe is an important feature of the carefully-planned and well-coordinated material handling system at the Lincoln, Calif., plant of Gladding, McBean and Co.

Production line lift truck applications include transportation of unit loads of wet pipe from pipe machines to drying sheds, green pipe from drying sheds to kilns, fired pipe from kilns to storage, and, in some cases,



*SLING handles engine at Marquardt Aircraft. Supports are canvas. Wheel moves gear along support rail to affix center of gravity.*

carrying of pipe to and from a production area where a plastic seal ring is applied.

Green pipe is dried on special racks, which allow lift trucks to carry unit loads from pipe machines to drying sheds and from drying sheds to tunnel kilns. Hauling distance is 700 ft. each trip. The truck makes an average of eight round trips per hour, including moving an empty rack to the pipe machines on each return trip.

After kiln burning, the pipe acquires its full structural strength and may be handled on lift truck forks. Special multiple-tine attachments are used for carrying the burned pipe to and from the plastic treating process. Side-shift attachment allows the operator to quickly align the tines with the pipe ends.

The number of tines varies with the diameter of pipe to be carried, ranging from two, for the largest pipe, to nine, for the smaller pipe diameters. Pipe sizes vary from four to 15-in. inside diameter.

Lift trucks working on the plastic seal process operate in a cycle like this: the truck picks up untreated pipe from the storage yard, carries it to a bench where workmen will apply the plastic seal, moves to another bench to pick up a load of treated pipe, carries the pipe to outside storage, picks up more untreated pipe and begins the cycle all over again. A complete cycle takes only 4 1/2 min.; a truck can move 120 pieces of four or six-in. pipe an hour.

## FEEDERS

### Feeding material in a batch operation . . .

For feeding flux and other material into a blending system for steel making, the Kaiser Steel plant at Fontana, Calif., uses two heavy duty electric vibrating feeders mounted on a traveling gantry.

This arrangement runs under bins of flux and other material, automatically collecting it and depositing it onto an inclined belt conveyor equipped with Jeffrey Reliance idlers. The conveyor carries the material to the top of storage bins where a motorized tripper side-discharges it into the bins.

Feeders used in this operation are Jeffrey No. 4 DL electric vibrating feeders which each handle 100 tons per hour. The flow of materials over the feeders is



*TURNTABLE with center dial moving at predetermined speed paces operators at Bendix Aviation. Ups production 60%.*

controlled by a rheostat enabling the operator to feed from a dribble to maximum capacity.

These traveling feeders are mounted on a gantry straddling the conveyor belt. The gantry is propelled by two Cleveland Tramrail gantry drives which are equipped with automatic accelerating controls operating through the reactor panel. This assures even distribution of motive forces on both sides of the gantry. This prevents any skewing and the Cleveland Tramrail automatic accelerating controls allow the operator to spot the feeders with ease and accuracy.

Air operated gates control the feed from the bins into the feeders as soon as they are spotted.

The original design for this setup was provided by the General Conveyor Co.

## RACKS, FRAMES, BINS

Reducing parts damage . . .

Bendix Aviation Corp., North Hollywood, Calif., has reduced damage to parts by 30% and speeded handling by 15% by the use of A-frame trucks. Constructed of steel angle bars, they carry either baskets or trays.

The firm previously used metal and plastic tote boxes in 3-tier trucks. This was too slow and caused too much parts damage. Parts also had to be removed for washing prior to assembly. With A-frame trucks, parts in metal baskets can be submerged in cleaning solution without removal.

Bendix also uses collapsible baskets in conjunction with fork trucks for handling castings, forgings, etc., in the production process. The firm previously used wooden tote boxes with sides, but they took up too much space and had high maintenance costs. Wire baskets can be folded when not in use, thus saving storage space. By using these baskets, Bendix reports it has cut handling costs by 25%.

Storing items in original packing cases . . .

The Chevrolet assembly plant in Los Angeles builds more than 100,000 cars and trucks each year without a stock warehouse. It can do this because many items are stored alongside the assembly line in original packing cases.

Approximately 45 freight cars are unloaded each working day and parts are delivered to predetermined assembly line locations by fork trucks. Any excess material is stored temporarily at rail unloading areas.

While there are many bins located along the assembly line, items such as tail-light assemblies, steering

wheels, carburetors, and other damageable items are kept in original packing cases and are used by production workers directly from the shipping case. This not only eliminates double handling, but keeps parts damage to a minimum.

How to store \$1,000,000 . . .

Storing \$1,000,000 is a touchy business. But it's a job that the Jeffries Banknote Co., Los Angeles, must do every day. Most of this is in the form of currency (mostly of foreign countries), travelers' checks, negotiable bonds, etc.

Moving the wet-printed loot formerly required two handling operations—from press to racks, and (after drying) to processing rooms. This problem was turned into a continuous-flow solution by using Tube-Strut clamps for pipe racks that serve as double-duty drying shelves and conveyors.

Previously, the delicate sheets of printed matter were carried by hand to massive wooden frames covered with chicken wire on which the engraved impressions dried for 24 hr. and were again moved by hand to the processing room.

The Tube Strut universal clamp provides a stronger, more durable drying rack than the wooden ones then in use. Casters were added to the stationary racks so that instead of the two handling operations that were being performed by pressroom girls, the racks did the whole job of not only drying but also transporting the heavy stacks from one room to another.

Two girls can easily handle each rack, which they themselves assembled in odd hours when not busy with regular duties. Constructed of ½-in. pipe and ½-in. Tube-Strut clamps, ordinary ¼-in. plywood (painted to prevent warping) was set on the pipe-and-clamp frame, to make 9 shelves. If needed, an additional shelf can be added at the top of the frame.

## PUMPS

Using pumps to feed production lines . . .

Ever thought of using pumps to feed liquids to your production lines?

A sticky material handling problem was solved at General Foods Corp., San Leandro, Calif., by using pumps instead of pallet-handled drums for its glue operations.

In the old way, 55-gal. drums were loaded four to a pallet. The drums were transported to certain case-sealing stations and the glue was sucked out with a small air pump. But beside the hazards of drum handling, the operation was inefficient because the pumps would not get all the glue from the drums. But that's not a problem now.

When a tanker pulls up to the pier, glue is pumped by a centrifugal pump to a huge, mild steel storage tank. Flow is controlled by check valves.

When glue has to be called for it is pumped from the storage tank by a positive displacement pump. Lines feed right to the production plant where needed.

In an operation like this, it is estimated that savings can amount to 1.65 cents per lb. of glue.



## SPECIAL MANUALS

### PRODUCTION LINE M-H...

### ...HOSE and COUPLINGS

FOR YOUR FREE COPY, CIRCLE APPROPRIATE NUMBERS ON POSTCARD, p. 55

#### Booklet on live storage racks

Cutting costs in order picking and distribution is the subject of this folder. Strong pictures of unusual applications which include gravity racks for a cold room . . . automatically guided tote boxes on a conveyor system . . . and racks for stocking a wide variety of items make for informative reading. *Lamson Corp.*

... FOR YOUR COPY, CIRCLE NO. 100

#### 98 pages on feeders and conveyors

Action type pictures, specifications and diagrams combine to present this company's whole range of feeders and conveyors. Units detailed range in capacities from a few ounces to 2,000 tons per hour. If your problem concerns handling and controlling the flow of solid material in any form, there's a good chance you'll find a solution in this catalog. *The Jeffrey Manufacturing Co.*

... FOR YOUR COPY, CIRCLE NO. 101

#### Overhead conveyor handling systems

Detailed in this booklet is one of the most adaptable conveyor systems on the market. Pictures illustrate various uses to which overhead conveyors can be put, and demonstrate the fact that they can run horizontally, straight up, or straight down, in, out and around, or upside down. The chainveyor handles loads up to 60 lb. per foot and diagrams on page 5 show how a combination of turns may be obtained in the system by joining standard horizontal or vertical curves. *Chainveyor Corp.*

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#### Brochure describes new series of lift trucks

This 12-pager covers performance, construction, and maintenance features of the Hyster Challenger 60, 70 and 80 pneumatic tire lift trucks. Capacities range from 6000 to 8000 lb. at 24-in. load center. Performance features, such as engine, transmission, steering, braking, maneuverability, etc., are detailed. The brochure also includes a list of options, attachments, and accessories, as well as a cut-away view showing all machine components. *Hyster Co.*

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#### Double girder cranes for regular service

This bulletin lists the specifications of double girder cranes up to 10-ton capacities and spans to 60 ft. It also details the way in which the firm's entire series has been

re-engineered to meet requirements of present demands for extra quality and performance. Redesign includes extensive use of standardized components and interchangeable parts for mass-production assembly line economies. Pictures, specs and charts add impact. *Borg-Warner Corp.*

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#### Electric hoist saves ceiling height

An average of one foot of ceiling height in new plant construction, or an additional foot of lifting height in existing plants, is made possible by the electric hoists described in this 34-page catalog. Pictures, specs and charts describe how the unusual balanced-around-the-I-beam design lifts loads higher than any other hoist. *American Engineering Co.*

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#### Tractor-shovel versatility shown

This foldout is crammed with specifications of tractor-shovel units ranging in size from 2000 to 9000 lb. capacity. Each page carries a fact-filled description and on the reverse side of the sheet are listed the attachments to increase the versatility of the basic equipment. They range from a blacktop spreader to log-lumber grabs. *Frank G. Hough Co.*

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#### Attachments make fork lift versatile

Ten quick-change attachments are described in this illustrated brochure as enabling one fork lift to handle all types of solid or semi-solid material. And attachments require no additional hydraulics, because the unit comes equipped with a three-spool valve as standard equipment. *Massey-Ferguson Industrial Div.*

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#### 32-page brochure on sling chains

Herc-Alloy chain, of which the slings described in this booklet are made, is different from ordinary sling chain in that it does not require periodic annealing. In fact, since it is heat treated, it should never be annealed . . . and the chain will neither crystalize nor develop brittleness. Read more details on the opening pages of this brochure, and then concentrate on the types of slings and specs which follow. *Columbus McKinnon Chain Corp.*

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### Handling handbook highlights skids

Steel skids in a variety of shapes and sizes occupy the first seven pages of this well illustrated booklet on material handling equipment. Steel boxes, bar carriers, collapsible boxes and special purpose units are also shown at in-plant locations where they have been proven to increase production efficiency. Take special notice of the drum racks on page 18. *Republic Steel Corp.*

... FOR YOUR COPY, CIRCLE NO. 109

### 70-page handbook on roller and wheel conveyors

This comprehensive book thoroughly covers the whole line of roller and wheel conveyors manufactured by this company. Light and heavy-duty wheels, and conveyor rollers ranging in diameter from 1 3/8 in. to 6 1/2 in. and in capacity from 60 to 16,000 lb., are fully described. Pictures, specifications and charts make this more than a handbook ... it's a textbook in the conveyor field. *Mathews Conveyor Co.*

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### In-the-floor, overhead Trukveyors

These systems consist of endless powered strands of rivetless chain which are in the floor or suspended overhead. Trucks or dollies can be attached to this chain and towed over any selected path. The 25 pages of this manual contain diagrams and pictures to show you how units can save time and money in any handling system. *Link-Belt Co.*

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### Wire rope slings for safe, easy handling

Wire rope slings can be used in many of your plant operations. And there's a wide range of slings to meet any job. They're all pictured and detailed in this brochure. Enlarged cross-sections show you the strength of the slings, and pictures of fittings give you an idea of the adaptability of wire rope slings. *The Colorado Fuel and Iron Corp.*

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### Sling chain catalog simplifies ordering

There's a specific way to set about ordering sling chain, and it's detailed on page 3 of this 16-page booklet. Listed also are grades of chain available, work load limits and specs, sling and grab hooks available, etc. On page 15 is a copy of the definitions and cautions you should know if you use sling chain. *Campbell Chain Co.*

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### Industrial truck selector guide

Over 150 models of industrial trucks are illustrated in this 20-page, two-color booklet, containing factors such as capacity, frequency of use, power source and use of semi-standard or special trucks, as a ready reference. Individual specs and outstanding features about each model help determine the correct truck for each job. Additional facts on selection of pallets and skids make the booklet complete. *Automatic Transportation Co.*

... FOR YOUR COPY, CIRCLE NO. 114

### 24 pages on gravity and power conveyors

Steel roller conveyors, straight and curved sections, as well as such special items as a portable conveyor, aluminum and wheel conveyors, are detailed in this well illustrated booklet. Included also are specs on ball casters,

supports, belt tables, and other specialized gravity and power units. See especially the Extend-O-Veyor on pages 14 and 15. *Standard Conveyor Co.*

... FOR YOUR COPY, CIRCLE NO. 115

### Double ball bearing caster catalog

The double ball bearing swivel construction of the caster described in this 20-page manual is worth special note. It distributes the load evenly around the raceways, cutting wear on plant floors. The complete selection of casters described includes light duty casters and ranges to extra-heavy duty units. *Faultless Caster Corp.*

... FOR YOUR COPY, CIRCLE NO. 116

### Electric pallet lo-lift truck

A touch of the button on the rear of the handle on this lo-lift truck eliminates time wasting between pallet and truck, by giving complete control over rear wheel retraction and extension, even when the pallet is empty. How it works is the subject of this well illustrated bulletin, which comes complete with charts and specs. *Barrett-Cravens Co.*

... FOR YOUR COPY, CIRCLE NO. 117

### "How" booklet as MH educational tool

"Hand Trucks Facts and Factors" is a 12-page fully illustrated educational tool which explains basic points to be considered in setting up an efficient material handling system. Selection of the right truck for the job, determining correct capacity for loads to be handled, and such facts as choosing between pallet and platform loading are covered. Drawings simplify recommended pallet design; explained are such features as chamfered end boards, overhanging top deck boards, single and double-faced, reversible and non-reversible pallets. *Automatic Transportation Co.*

... FOR YOUR COPY, CIRCLE NO. 118

### Caster wheels can cut costs

This 12-page catalog colorfully illustrates—through pictures and specs—how various types of casters can be used for specific handling equipment. It introduces new developments like the "Lockweld" (steel casters without a king-pin) and the "Lamilon" (all plastic wheels). In addition, solid rubber and pneumatic-tired wheels are featured. *The Fairbanks Co.*

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### Jib crane described in detail

The jib crane which is the subject of this booklet, is specifically designed to meet a wide variety of plant lifting needs. Entirely self-supported, it swings through a full 360 deg. for handling over a large area, and it has been developed for use with either a chain block or electric hoist. Specifications combine with pictures and dimension tables on page 7 to provide full facts. *Borg-Warner Corp.*

... FOR YOUR COPY, CIRCLE NO. 120

### Giant 120-page handbook on belt conveyors

Sufficient engineering data is contained in this catalog for an engineer or layman to design a belt conveyor ... especially by using the Terminal Selection Tables listed in the front of the book. They are indexed and classified for easy use. In addition, a complete line of necessary equipment required in building a belt conveyor is listed. *The Jeffrey Manufacturing Co.*

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## Use a Tape that Really Measures Up... Flash-Tite

Perfectly proportioned... versatile... and every inch a winner — that's Flash-Tite! Naturally, America's queen of gummed tapes.

The secret of Flash-Tite's unmistakable class? Its "balanced" formula which makes taping easier, faster, more effective. Flash-Tite, for instance, gives quicker grab, yet remains sticky longer. It eliminates tail end curl problems. It molds easily around the corners of your problem cartons.

*You* be the judge. Let us send you samples (of Flash-Tite, that is) and further details on what Flash-Tite's classic measurements can mean to you. We think you'll find Flash-Tite a real come-through performer. For further information write: Crown Zellerbach, Distributor Sales Division, 343 Sansome Street, San Francisco, California.

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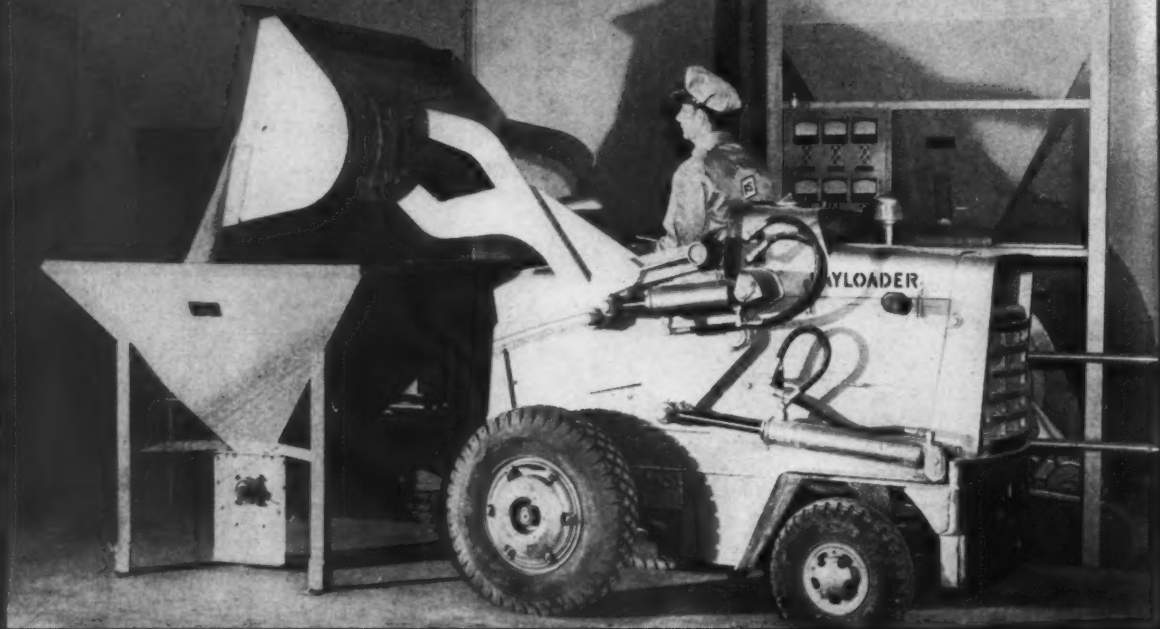


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# There's a big difference in **PAYLOADER®** performance



**Big Load Capacity** The model H-25 "PAY-LOADER" tractor-shovel has a carry capacity of 2,500 lbs. — carries more for its weight than any machine in its class.

**More Digging Power** Breakout force of 4,500 lbs. is available at the bucket cutting edge — more than on any machine near its size. Exclusive power-transfer differential makes traction and "crowding" power more positive, especially when traction conditions are slippery.

**More Maneuverable** Shortest turning radius (only 6 ft. at rear wheel hub) and power-steer make it possible to operate in closer quarters with greater speed and safety.

**Power-shift Transmission** The model H-25 is the only machine in its class having a full-reversing power-shift transmission with two speed ranges forward and reverse — the low ranges for digging power and close maneuvering, the high ranges for

fast, economical travel. All "clutching" and gear-shifting is eliminated.

**Lower Maintenance** The boom and bucket mechanism is of rugged, simple design with fewer parts and linkages. Quality materials are used throughout, including anti-friction bearings at critical pivot points.

**Longer Life** The most complete system of protection has been engineered into the Model H-25 to insure long life and freedom from trouble: triple air cleaning system for the engine; cartridge-type filters for all three oil systems; self-adjusting, sealed hydraulic brakes; closed, pressure-controlled hydraulic system; grease and oil seals on all pivots and ball joints.

Your Hough Distributor is another reason why you'll get lower-cost-per-ton bulk material handling from a "PAYLOADER". He is ready to give you full information on the H-25, or larger models up to 12,000 lb. carry capacity.

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### Folder on close-quarter maneuvering system

Describes Monotrol control system installed on Hyster trucks. Monotrol is a foot pedal that controls the automatic transmission and coordinates directional selection and engine speed. Pedal has two pressure pads clearly marked for direction. Pressure on left pad moves truck forward, while right pad moves truck backward. Folder contains details. *Hyster Co.*

... FOR YOUR COPY, CIRCLE NO. 122

### Metal lumber facilitates steel building

Metal lumber is made of heavy gage steel, bonderized after fabrication, and engineered with slots for easy erection. The company calls it "Metal Lumber" because ease of assembly makes your own imagination the only limit to its applications. This 20-page booklet will give you a lot of ideas, however, and after looking at the pictures and specs you'll realize the sky is the limit for use of steel in your plant. *Republic Steel Corp.*

... FOR YOUR COPY, CIRCLE NO. 123

### "Make ceiling pay dividends"

This intriguing 28-page booklet shows you how an overhead conveyor on your ceiling helps put a ceiling on your overhead. Large installation pictures show the units at work, saving space . . . production time . . . providing "straight line" production . . . synchronizing operations providing gentle handling . . . and versatile operations. All types of industries and all kinds of conditions can be met by these conveyors. *Link-Belt Co.*

... FOR YOUR COPY, CIRCLE NO. 124

### Overhead material handling applications

Completely revised and up-to-date, this 12 page engineering and application data book covers various types of carriers, cranes, tractors, track switches, grabs, electrification. Detailed studies of track design, peening and stresses are given. A large number of photographs of a wide variety of installations are included. *The Cleveland Crane & Engineering Co.*

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## HOSE and COUPLINGS

### Hose for all types of industry

Hose and fittings for air, water, steam and other commodities are described in this 16-page manual. Included are special sections on water suction, petroleum, industrial fire, spray and welding, special service. The quick reference charts and general hose data are especially helpful. *Raybestos-Manhattan, Inc.*

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### 64 pages on flexible metal hose and tubing

Packed into these pages are types, sizes, engineering specifications, uses, construction, advantages of seamless, corrugated, and strip-wound hose fittings and assemblies. Metals used are bronze, brass, steel, stainless steel, aluminum, monel, super nickel and other metals. Pics, drawings and spec sheets point the way. *The American Brass Co., American Hose Div.*

... FOR YOUR COPY, CIRCLE NO. 127

### Bellows, pipe and fittings, fluorocarbon products

These three bulletins—each four pages—give you engineering data on molded Teflon bellows . . . Teflon lined pipe and fittings . . . and quality fluorocarbon products. Each bulletin is crammed full of facts to satisfy all questions. *Resistoflex Corp.*

... FOR YOUR COPY, CIRCLE NO. 128

### Corrugated, interlocked hose and couplings

These two types of metal hose—described in this 12-page handbook—can be used for a wide number of applications in your plant. Complete specification and application data are provided in tables . . . and pictures show you standard assemblies that have many uses. *Flexonics Corp.*

... FOR YOUR COPY, CIRCLE NO. 129

### 70 page reference book on industrial hose, fittings

With this book on your shelf, you can become an authority on hose and fittings. Especially helpful is the 20-page engineering data section which includes a fluid reference chart, and sections on selection, planning installations, operating pressures, vacuum data, etc. Hose and fittings for all types of installations are then pictured, with complete specifications for each. *Aeroquip Corp.*

... FOR YOUR COPY, CIRCLE NO. 130

### Hose and fittings in lubrication equipment

This comprehensive, 32-page booklet includes hose and fittings used in lubrication systems. A wide range of hose centers are pictured in a selection chart that includes application, specifications and complete description. Connectors adapters, and fittings are also pictured and fully detailed. Photos and drawings help explain their uses. *Lincoln Engineering Co.*

... FOR YOUR COPY, CIRCLE NO. 131

### Data on Teflon transfer hose, nozzle liners

These new chemically inert products are finding many uses in the West. The transfer hose has been used for jet and missile fuel handling and ground handling equipment. The nozzle liners have been used in the nozzle openings of reactors, vessels, pumps, condensers, and other process equipment. They are equally suitable for use in heat exchanger tubes at the tube sheet opening. All specification and engineering data are available. *Resistoflex Corp.*

... FOR YOUR COPY, CIRCLE NO. 132

### Routing, installation of flexible hose assemblies

Clear-cut drawings, with "right and wrong" examples are your guide for routing and installation of flexible hose assemblies. The 23 illustrations take you through the best means to avoid abrasion, heat damage, best appearance, etc. Charts detail minimum bend radius, flexing and operating pressures. *Aeroquip Corp.*

... FOR YOUR COPY, CIRCLE NO. 133

### Flexible connectors of Teflon

Specifications and application data show you the advantages of these flexible connectors for hydraulic, steam, chemical, pneumatic, food, and conduit uses. The characteristics of Teflon are spelled out so you can see how these advantages can work for you. *The American Brass Co., American Hose Div.*

... FOR YOUR COPY, CIRCLE NO. 134

## SYNTHETIC BELT replaces conventional belts

Outlasts other belts . . . reduces maintenance to zero . . .

**A** MODERN SYNTHETIC BELT has been installed at the Northwestern Lumber and Manufacturing Co., Everett, Wash., replacing conventional cord belting.

The advantages of this new belt? It is outlasting the cord belts at least twice as long . . . and maintenance—which sometimes had to be done every week—has been reduced to zero.

In one instance, Northwestern used a 4-in. medium



Dixylon (R. & J. Dick Co. Inc.) belt on its matcher. The belt was installed endless on the job in about 10 minutes.

Formerly, the old belts had to be maintained almost every weekend. But the new belt has been going strong for several months without any downtime for maintenance.

The Dixylon belting has a center section consisting of one or more strips of pre-stretched polyamide plastic bonded to outer plies of a synthetic fabric. The driving surface is covered with a frictioned surface.

Because of the molecular construction of the plastics, the belt will not stretch in operation and can run for years without takeup or idlers, if fitted to the proper initial tension.

The belt is non-slip, requiring no dressing or conditioner. It can be installed endless in minutes, using a simple bevelling device and a cement. The belt is resistant to high temperature and humidity, oils and many acids. Its maximum temperature is approximately 200 deg. F.

The Dixylon belting at Northwestern Lumber and Mfg. Co. was installed by the Everett Belting Co. Belting was supplied out of R. & J. Dick's Seattle office.

## PAINTING four times faster with spraying

Time and material saving by spraying on adhesives . . .



**P**AINTING IS FOUR TIMES FASTER at Clutch Exchange, Inc., Denver, Colo., since the firm turned to spraying adhesive on industrial brake linings for subsequent bonding to the brake band.

Before spraying, the adhesive was brushed on. But now with spraying, there is both time and material savings. Anywhere from  $\frac{1}{2}$  to  $\frac{2}{3}$  the material is saved . . . and the coating is smoother, more uniform, easier and quicker to apply.

The system consists of a Binks Model 19 spray gun, a 5-gal. pressure tank and the necessary valves and hoses. Air pressure is held low, 35 to 40 psi., and fluid pressure is around 15 psi., minimizing overspray and eliminating the need for a spray booth.

Before the linings are bonded to the brake bands, the bands are shot blasted, then coated with a phenolic resin to cut down corrosion.

After the linings are sprayed with adhesive they are allowed to stand for 24 hours, then are clamped to the brake bands. After this, they are baked in an oven for approximately 30 min.

Oven temperature is set to give a bond line temperature of around 400 deg. F. Bond line temperature is the temperature between the band and the lining, not necessarily the oven ambient temperature.



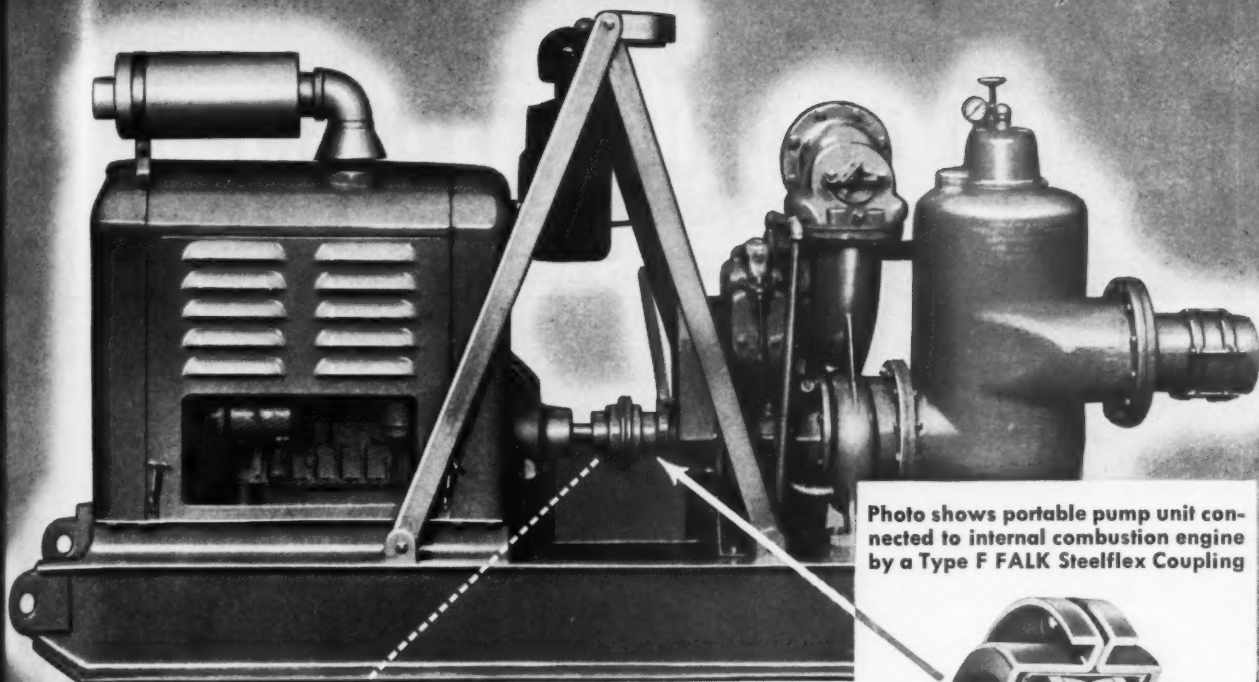
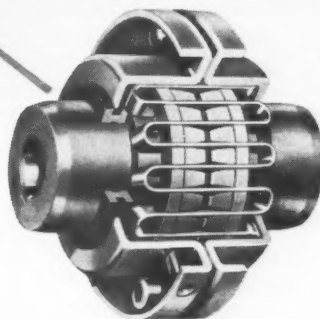


Photo shows portable pump unit connected to internal combustion engine by a Type F FALK Steelflex Coupling



## How FALK Couplings give your connected machinery Double Protection

**FIRST:** They protect against shaft misalignment. Some degree of shaft misalignment is unavoidable—and unless protective compensation is provided, additional loads are developed on shafts, bearings and other revolving elements. The result is excessive wear-and-tear—and often actual breakage....FALK Steelflex Couplings compensate for either angular or parallel misalignment—or for the more serious condition involving both! The exclusive Steelflex gridmember which joins the two hubs is not fastened to either hub; thus, either hub can shift in any direction without imposing a load on the other hub.

Yet, important as protection against shaft misalignment is to you, it is only one function of the *truly flexible* FALK Steelflex Coupling.

**SECOND:** They protect against torque fluctuations which create excess wear on connected machines and frequently induce destructive shaft misalignment. The exclusive FALK Steelflex grid-groove design cushions shock loads, dampens vibration, reduces impact loads as much as 30 per cent. You get this extra margin of protection that can mean the difference between operating and breakdown! You save on maintenance costs. And—you prolong the service life of your machines!...For complete information, ask your FALK Representative or Authorized Distributor. Or—write direct for Bulletin 4100.

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**THE FALK CORPORATION, MILWAUKEE I, WISCONSIN**

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Manufacturers of Quality Gear Drives and Flexible Shaft Couplings

### Basic Type F FALK STEELFLEX COUPLING fills the needs of 90% of industrial applications

This cutaway view shows the exclusive Steelflex design which provides torsional resilience with the strength of steel. This torsional resilience spreads peak or shock loads over a relatively long increment of time, thus greatly reducing stresses in connected machinery.

The versatile Type F Steelflex can be used horizontally or vertically, without modification or special parts. It is ideally suited to 9 out of 10 applications. For unusual applications involving overload conditions, extended shafts, brakes, etc., standard designs of dual-purpose Steelflex couplings are available.

For most applications, you can give your machines the extra protection afforded by FALK Steelflex Couplings at no extra cost!

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# HELPFUL LITERATURE

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CIRCLE APPROPRIATE KEY NUMBERS ON POSTCARD, P. 55

## AN INDUSTRIAL GUIDE TO HARDBOARD PRODUCT STYLING

Pictures prove the many uses and easy workability of a new type hardboard, detailed in this eight-pager. The hardboard is said to have 25% more flexural strength . . . increased surface hardness . . . uniform density. It can be used for a wide range of products and it can be sawed, die cut, punch, drilled, routed and shaped with standard equipment. *Silvatek Products Div., Weyerhaeuser Timber Co.*

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## BULLETIN CITES ENGINEERING FEATURES OF LIGHT-DUTY POLY V-BELT

The light-duty Poly-V-"J" belt, a new drive for small machinery, is the subject of this four-page bulletin that cites over a dozen engineering advantages for this product that operates over sheaves as small as .8 in., pitch diameter. Installation pictures, drawings, and tables on standard pitch lengths, horsepower and sheave sizes are included. *Manhattan Rubber Div., Raybestos-Manhattan, Inc.*

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## ALUMINUM FOIL AND HOW IT CAN BE USED FOR INDUSTRY

A sparkling four-color cover printed on foil makes a good beginning for this 26-page brochure about industrial uses of aluminum foil. It illustrates the many, varied uses for thin metal in electrical, heating, cooling, textile, industrial packaging and other key applications. For the materials engineer and designer it provides a valuable insight into aluminum foil's potential uses. *Aluminum Co. of America.*

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## CONTINUOUS, ACCURATE SEPARATION OF ALL SCREENABLE MATERIALS

This 20-pager details the operation of a wide range of separators that can be used on any type of screenable material. Cutaway photos let you see how the units operate, and application data shows you how they can work in varied industries. All models are shown, along with complete specs. *Southwestern Engineering Co.*

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## EIGHT-PAGE BOOKLET DETAILS MN WROUGHT IRON AND ITS USES

Mn wrought iron—a specialty alloy wrought iron that contains about 1% manganese — is the subject of this eight-page booklet that features charts to show this new metal's improved impact resistance at sub-zero temperatures. The publication discusses working properties, availability and suitability in low temperature service where the possibility of brittle failure poses problems. Data on corrosion is included. *A. M. Byers Co.*

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## DESIGN HANDBOOK TELLS HOW TO SELECT PROPER PRESSURE SWITCH

A glossary accompanied by a chart of terms and a two-page 4-color chart that shows you how to select your pressure switch start you on the right road in this comprehensive design handbook on pressure switches. Throughout the rest of the 36-page book you'll find detailed descriptions, drawings, tables and photos to give you the complete picture. Data on trouble shooting and maintenance is the last-page bonus. *Barksdale Valves.*

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## 48-PAGE CATALOG TO HELP YOU SELECT MACHINISTS' TOOLS

Calipers, trammels, dial test indicators, protractors, planers . . . all these machinist's tools and many more are described and illustrated for you in this 48-page catalog. You'll find micrometers for every purpose, rules for every need; all kinds of squares for unexcelled accuracy, plus V-blocks, gages and complete sets of toolmakers equipment. Handy tables deal with decimal equivalents, wire gage standards, etc. *Browne & Sharpe Mfg. Co.*

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## DRAWINGS FEATURED IN 16-PAGER ABOUT COMPRESSORS IN 8 SIZES

Well-defined cross section drawings are featured in this 16-page bulletin about Unitair compressors, which covers eight sizes of the air-cooled units in the 15-125 hp., 81 -641 cfm. range. A complete run-down on all vital components is included in the fully illustrated publication. *Joy Manufacturing Co.*

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## 64-PAGE CATALOG COVERS LINE OF ELECTRIC PROCESS HEATERS

Electric process heaters and their many uses are detailed in this 64-page catalog that represents the most complete stock of these in the world—over 15,000 types. A detailed application section and a technical section to aid in accurate calculation of heating requirements are included in the publication, which illustrates and describes each product with lists of types, sizes and ranges. *Edwin L. Wiegand Co.*

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# A REPORT TO MANAGEMENT ON HOW Industry cuts costs with FIR PLYWOOD

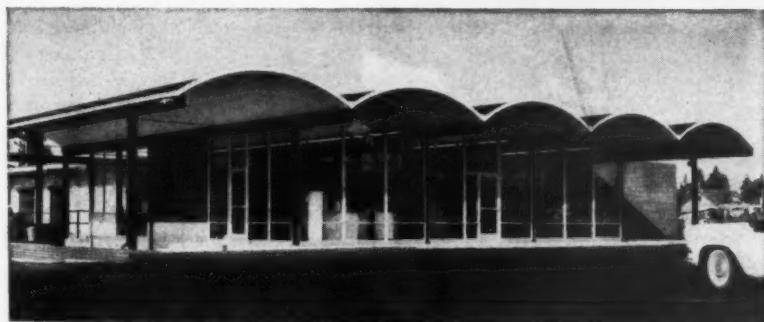
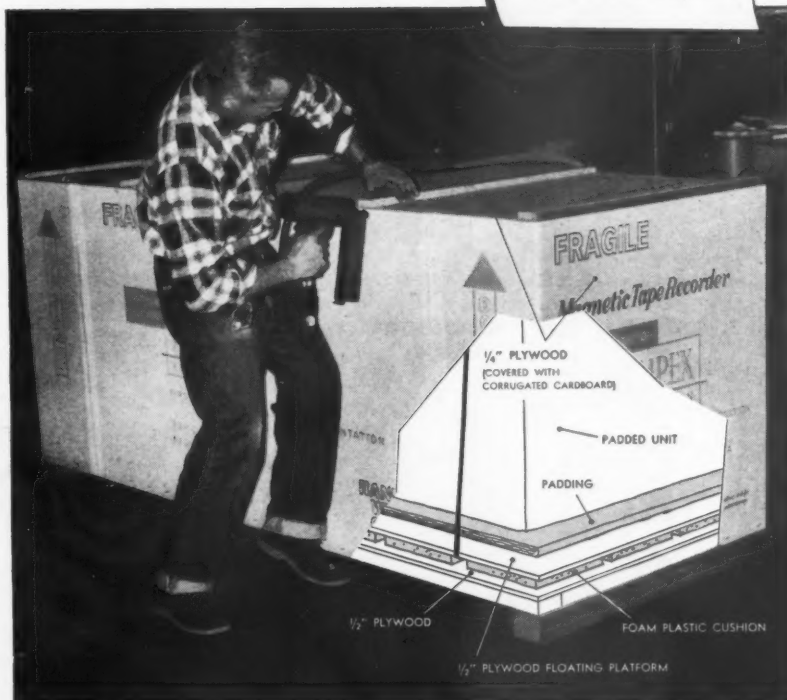
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**Prize Package**—This unique fir plywood shipping container features a free-floating inner floor that virtually eliminates in-transit damage to delicate electronic equipment—yet it costs and weighs only half as much as the bulkier crates it replaces.

Adapted by Ampex Corp., Redwood City, Calif., from a system developed by North American Aviation, the container was an award winner at the packaging competition recently conducted by the Society of Packaging and Materials Handling Engineers.

Termed "free floating suspension" packaging, the system is keyed to a foam plastic-supported fir plywood platform to which the padded lading is securely strapped. Sides, top and bottom of the crate itself are also fir plywood. Plywood construction provides strength and rigidity without the penalty of extra weight, gives maximum impact and puncture resistance, and also simplifies fabrication and assembly.



**Fir plywood vaulted roof components** helped hold overall construction costs to \$8.10 per square foot on this new Redi-Gas office-display-warehouse building in Tacoma, Washington. The multiple arch roof is composed of curved stressed-skin panels (each four feet wide and spanning 16 feet) which combine roof decking, finish ceiling and insulation. In addition to reducing on-site labor by as much as 80 per cent, the curved roof components permit large clear floor areas, spanning 16 feet without supplementary support from purlins or trusses. Each panel consists of Exterior fir plywood top and bottom skins glued to light lumber framing.



**Plywood patterns** help save hundreds of dollars monthly at Ryan Aeronautical Co. Fir plywood is cut to exact shapes of parts to be obtained from metal sheets and arranged for optimum cutting. Polaroid camera prints are rushed to production crews within minutes after the layout is approved.

FOR MORE INFORMATION about fir plywood—its uses, properties and advantages—write  
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**DATA SHEET COVERS 3 GRADES  
OF CORROSION-WEAR CARBIDES**

Two new compositions—a binderless carbide of tantalum and tungsten (Grade K601) and a tungsten carbide with chrome-cobalt binder (K701)—are detailed in this data sheet that also covers K501, a platinum-bonded tungsten carbide. Comparative mechanical properties, corrosion resistance test data and results of wear tests are covered in the publication. *Kennametal Inc.*

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**DATA SHEETS ON FLAT-TOP  
CONVEYOR; STAINLESS SCREW-FEEDER**

Two similar data sheets furnish you with facts on this firm's silent-top flat top conveyor, and the stainless steel screw-feeder. The conveyor piece gives specifications for belt, drive, supports, guardrail and body, and details design features. For the screw-feeder, there is a labelled photograph to point up outstanding features, plus a drawing, and a chart on the feed rate. *M-H Standard Corp.*

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**FACTS, FIGURES ON EXTRUDED  
ALUMINUM BRONZE RECTANGLES**

Stock sizes, weights, typical physical properties and specifications highlight this bulletin about extruded aluminum bronze stock rectangles for severe wear and abrasion applications. Available for use as wear plates and strips, gibs, ways, slides, etc., the rectangles are stocked in 47 sizes. *Ampco Metal, Inc.*

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**24-PAGE CATALOG ON MANIFOLDS  
FOR INDUSTRIAL GASES**

In this newly revised 24-page catalog you'll find specific information and illustrations on capacities, dimensions and arrangement for a complete line of manifolds for industrial gases. It includes data on recently developed manifolds for carbon dioxide and liquid oxygen, argon and nitrogen, as well as current facts on standard manifolds for use with helium, acetylene, hydrogen, propane and others. *Air Reduction Pacific Co.*

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**REVIEW OF POWER TRANSMISSION  
MACHINERY IN EIGHT PAGES**

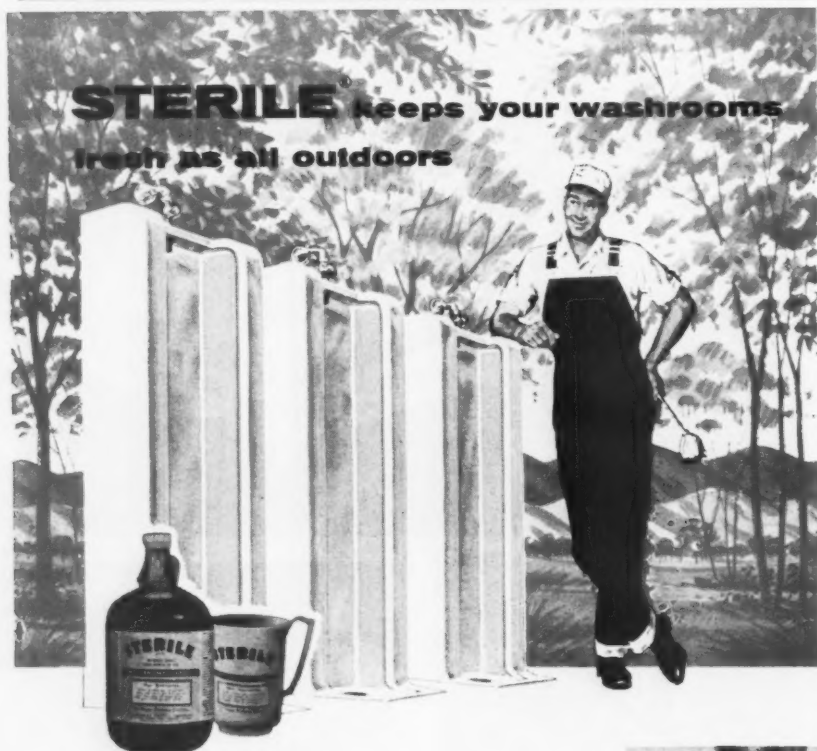
This brief but complete review of power transmission machinery features two of the line's newest products, Flexidyne dry fluid drives and Paraflex flexible cushion couplings. Steel conveyor pulleys, roller chain drives, various shaft couplings, V-belt drives, pillow blocks, bearings, take-ups, friction clutches, and speed reducers are among other products described and illustrated in the eight-page bulletin. *Dodge Manufacturing Corp.*

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**FOLDER FEATURES PHOTOS TO SHOW  
HEAVY-DUTY RAM TRUCKS IN ACTION**

A new line of heavy-duty ram trucks, with capacities from 20,000 to 80,000 lb. is the subject of this six-page folder that is highlighted with on-the-job photographs of trucks in action. Detailed specifications of seven models are included. The folder also covers in copy and photo form the exclusive Elpar attachments, which provided increased flexibility for various handling jobs. *The Elwell-Parker Electric Co.*

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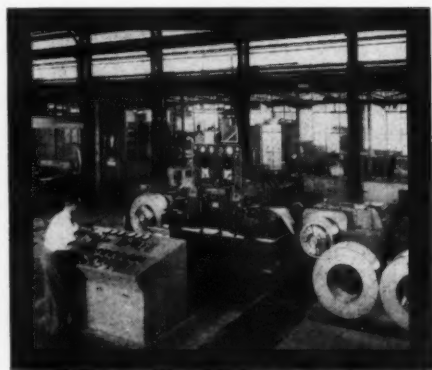
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#### PROPERTIES, APPLICATIONS FOR 13 MAJOR PLASTIC FAMILIES

Thirteen major plastic families in common industrial use are covered in this four-pager that compares outstanding properties and typical applications. Five major misconceptions about plastics are corrected in the booklet which deals with acrylic, implex, nylon, teflon, cellulose acetate, polystyrene, styrene, phenolic and fibrous glass reinforced polyesters and epoxies, polyethylene, vinyl and butyrate. *Cadillac Plastic & Chemical Co.*

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#### 28-PAGE HANDBOOK TELLS ALL ABOUT FINISHES FOR ALUMINUM

Said to contain the most advanced data obtainable on preparation and treatment of aluminum surfaces, this 28-page handbook explains theory and method for five major types of finishing operations—mechanical, chemical, anodic, organic and porcelain enamel. Advantages, disadvantages and costs of the operations are included in the handy-sized reference work. *Reynolds Metals Co.*

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#### BOOKLET CONTAINS TWO MECHANICAL ARTICLES ON SMALL PIPE WELDING

Two technical articles "Fabrication of Small Piping by Welding and Brazing", and "Designing of Welded Systems of Small Size Pipe" have been combined into this 12-page booklet filled with photos and sketches. The first covers applied welding engineering fields of applications, processes and equipment, etc., while the second covers principles of welding and brazing design. *Air Reduction Pacific Co.*

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#### FACT BOOK ABOUT STORAGE BATTERIES COVERS COMPLETE FIELD

The mystery of the black box is unfolded for you in this 32-page booklet "Facts About Storage Batteries". It has sections on the battery, its chemistry and construction; the electrical system, and a comprehensive "how-to-do-it" section. This includes data on recharging, purchase, installation and removal, storage and other subjects. *Exide Automotive Div., The Electric Storage Battery Co.*

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The new Louis Allis Pancake Motor is your solution to trouble-free power in any space-cramped motor application. The Pancake is a remarkably short flange-mounted motor — up to 60% shorter and 33% lighter than standard motors of the same rating! And it is built in *conventional* radial air-gap design!

It's done by an ingenious forming process which literally compresses the end coils of a conventional radial air-gap motor into an exceptionally short length. The result is a compact, light motor ideally suited for horizontal or vertical mounting on machine tools, roof ventilating fans, or any close-quarter installation where space is a critical design factor.

What's more, this is achieved without sacrificing a single desirable characteristic: the stator still contains the same iron and copper as standard Louis Allis motors . . . standard

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The housing and flange are cast in one piece: this permits extra-accurate internal machining which extends bearing life and reduces noise levels to a new low.

Investigate the Pancake Motor through your local Louis Allis District Office. Sized from 1 to 15 hp, at 1800, 1200, and 900 rpm, in open drip-proof and enclosed non-ventilated or fan-cooled enclosures. Write for Bulletins 2100 and 2150 to the Louis Allis Co., 438 E. Stewart St., Milwaukee 1, Wis.

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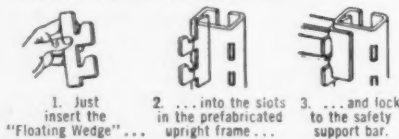
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### 1959 EDITION OF SPROCKET AND CHAIN CATALOG IS FIRM'S BIGGEST

The largest of its kind in the firm's 69-year history, this comprehensive illustrated engineering and stock catalog contains 88 pages of data on sprockets and chain drives. Full details on the company's 1300 different stock sprockets and its various types of roller chains, along with technical data and several pages of chain drive engineering information, are included. *Cullman Wheel Company.*

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### WELDED STEEL WATER PIPE DETAILED IN ILLUSTRATED FOLDER

A number of case history pictures are featured in this new illustrated folder on its welded steel water pipe. Subjects treated are wide range of diameters and wall thicknesses; durability; rigid testing; lengths up to 50 ft.; high flow capacity; high strength; and field fabrication. *Armco Drainage & Metal Products, Inc.*

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### ALL ABOUT THE STACKBIN SYSTEM AND HOW IT CUTS COSTS

The Stackbin system and how it saves are explained to you in this 20-page illustrated catalog that covers bins, racks, shelves, hoppers, pallets, cribs, trucks and containers that complement each other to bring a practical solution to all types of material handling and storage problems. Plus a host of pictures showing the products in use, there are specifications as well as some handy templates to make your own layout. *Stackbin Corp.*

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### POWER SAW DESIGN FEATURES DETAILED IN 12-PAGE BROCHURE

The cut-off capacity and operating ease of the Model C-24 power saw are described and illustrated in this brochure's 12 pages. Among the many features and improvements covered are a new chip disposal system, a redesigned saw feed control mechanism which increases blade life 200 - 500%, an improved drive system to supply adequate power for new accessories and a new coolant system. *The DoAll Co.*

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**FEATURES, USES FOR ALUMINUM  
SELF-PLUGGING BLIND RIVETS**

Outstanding features and typical applications of MS aluminum self-plugging blind rivets are outlined in this four-page folder filled with technical data on material specifications, shear and tension strength values, hole size recommendations and shop practice notes. Dimensional drawings for both protruding and countersunk head styles are provided. *Huck Manufacturing Co.*

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**ALL ABOUT LUBRICATED PLUG  
VALVES WITH SPECIAL COATINGS**

Descriptions of coating properties, valves available, recommended applications and installation pictures highlight this eight-page bulletin about special coated lubricated plug valves. The three valves — K51 (Penton), Kanigen and Teflon—are additions to the firm's complete line of corrosion-resistant alloy valves. *Rockwell Mfg. Co.*

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**SHOP TECHNIQUES FOR MAGNESIUM  
ALLOYS USED AT HIGH TEMPERATURES**

In this 28-page shop guide for elevated-temperature magnesium alloys, you'll find recommended practices for working magnesium alloys of the thorium and rare-earth-metal families. Shop operations covered are machining (including chemical milling), forming, joining, assembly protection and finishing. Tables listing tool temperatures, bend radii and various welding data are included.

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**REFERENCE GUIDE FEATURES LATEST  
DATA ON NICKEL-CLAD COPPER WIRE**

Latest basic technical data on nickel-clad copper wire is contained in this revised bulletin that serves well as a reference guide to properties, advantages and applications of the wire. Two easy-to-read charts showing mechanical and electrical properties of the bi-metal are provided, as well as photographs of typical applications. *Riverside-Alloy Metal Div., H. K. Porter Co., Inc.*

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**FACTS, PHOTOS ON PLANNING  
A PAINT FINISHING SYSTEM**

Thirty-two photographs are a feature of this 24-page reprint of six articles about what to consider when planning a paint finishing system. Conveying systems, layout, equipment for metal preparation, ovens, method of application and auxiliary equipment are covered in the presentation which has line drawings to illustrate a typical layout and gives details of five stages of metal cleaning and preparation. *J. O. Ross Engineering Div., Midland-Ross Corp.*

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**19th EDITION OF "BETTER WAYS  
TO PACKAGE, UNITIZE AND SHIP"**

Crammed with ideas for improving packaging and shipping methods in all industries, this handy catalog, in its 19th edition, includes several pages of pictures that show typical steel strapping applications. Other sections of the pocket-size, 50-page, guide give you necessary data on the firm's extensive line of steel strapping, tools and equipment. There is also picture treatment of floating loads, wall anchored and open top loads. *Signode Steel Strapping Co.*

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**VIBRATORY PACKERS, HYDRAULIC JOLTERS  
DETAILED IN CATALOG SECTION**

This four-page catalog section on "pulsating-magnet" vibratory packers and hydraulic jolters tells how these products speed packaging and reduce container costs by increasing net content of containers as much as 20% to 30%. The catalog presents complete descriptions, data and specifications for eight standard electromagnetically vibrated packers and for two standard model "fluid-power" jolters, and illustrates typical applications and installations. *Syntron Company.*

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**HOW TO SELECT FELTS FOR MECHANICAL  
FILTRATION OF AIR, GAS, LIQUIDS**

Performance characteristics and selection of proper felts for mechanical filtration of air, gases and liquids are covered in this technical data sheet which lists revisions on porosity percentage figures for felt weights, and includes data on merchandise not listed in the original 1946 issue. A table summarizes white and grey filter felts available in a broad spectrum of widths, weight and thickness. *American Felt Co.*

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**PRODUCTION PAYOFF WITH AIR  
POWERED SCREW DRIVERS**

This 20-pager tells all about air powered screw drivers that speed assembly of a thousand products. Large cut-aways and photos let you look at the workings of the tool... and charts and tables give you specifications and applications. *Ingersoll-Rand Co.*

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**1600-DEG. AIRCRAFT BOLTS  
DESCRIBED IN 4-PAGE BULLETIN**

Aircraft bolts for working temperatures to 1600 deg. F.—highest heat standard fasteners ever offered—are detailed in this four-page illustrated bulletin with charts and graphs to show comparative tensile and stress rupture strengths of these 1615 series bolts fabricated from one of four advanced metal alloys. The fasteners are typical airframe and engine series bolts with external-wrenching, 12-point head configurations. *Standard Pressed Steel Co.*

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**WESTERN INDUSTRY/JULY 1959**







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11	38	65	92	119	146	173	200	227	254	281	308	335
12	39	66	93	120	147	174	201	228	255	282	309	336
13	40	67	94	121	148	175	202	229	256	283	310	337
14	41	68	95	122	149	176	203	230	257	284	311	338
15	42	69	96	123	150	177	204	231	258	285	312	339
16	43	70	97	124	151	178	205	232	259	286	313	340
17	44	71	98	125	152	179	206	233	260	287	314	341
18	45	72	99	126	153	180	207	234	261	288	315	342
19	46	73	100	127	154	181	208	235	262	289	316	343
20	47	74	101	128	155	182	209	236	263	290	317	344
21	48	75	102	129	156	183	210	237	264	291	318	345
22	49	76	103	130	157	184	211	238	265	292	319	346
23	50	77	104	131	158	185	212	239	266	293	320	347
24	51	78	105	132	159	186	213	240	267	294	321	348
25	52	79	106	133	160	187	214	241	268	295	322	349
26	53	80	107	134	161	188	215	242	269	296	323	350
27	54	81	108	135	162	189	216	243	270	297	324	351

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4	31	58	85	112	139	166	193	220	247	274	301	328
5	32	59	86	113	140	167	194	221	248	275	302	329
6	33	60	87	114	141	168	195	222	249	276	303	330
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9	36	63	90	117	144	171	198	225	252	279	306	333
10	37	64	91	118	145	172	199	226	253	280	307	334
11	38	65	92	119	146	173	200	227	254	281	308	335
12	39	66	93	120	147	174	201	228	255	282	309	336
13	40	67	94	121	148	175	202	229	256	283	310	337
14	41	68	95	122	149	176	203	230	257	284	311	338
15	42	69	96	123	150	177	204	231	258	285	312	339
16	43	70	97	124	151	178	205	232	259	286	313	340
17	44	71	98	125	152	179	206	233	260	287	314	341
18	45	72	99	126	153	180	207	234	261	288	315	342
19	46	73	100	127	154	181	208	235	262	289	316	343
20	47	74	101	128	155	182	209	236	263	290	317	344
21	48	75	102	129	156	183	210	237	264	291	318	345
22	49	76	103	130	157	184	211	238	265	292	319	346
23	50	77	104	131	158	185	212	239	266	293	320	347
24	51	78	105	132	159	186	213	240	267	294	321	348
25	52	79	106	133	160	187	214	241	268	295	322	349
26	53	80	107	134	161	188	215	242	269	296	323	350
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**QUICK, BUT COMPREHENSIVE, LOOK  
AT FOUNDRY FACILITIES**

A quick, yet comprehensive look at this firm's foundry facilities is provided in this 16-page brochure that covers pattern making, core and mold forming, pouring, processing, inspecting and examples of how steel castings can economically replace fabricated pieces. The company's testing facility, with all its equipment, is also fully described. *Kay-Brunner Steel Products, Inc.*

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**BULLETINS COVER TWO SERIES  
OF SWIVEL-PLATE CASTERS**

The H900 series of heavy-duty swivel-plate casters and the L900 series of medium duty casters are described in two similar bulletins. The heavy-duty series with load capacities up to 1,500 lb. per caster includes five types of wheels in 6 and 8 in. diameters. The L900, for trucks, etc., carrying loads up to 2,000 lb., come in 5, 6 and 8-in. sizes. Rigid-plate companion casters for each series are also covered. *Faultless Caster Corp.*

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**FACT SHEET AND PICTURES  
ABOUT MAGNETIC AMPLIFIER**

An illustrated data sheet gives you complete information about a new magnetic amplifier for current-proportioning control instruments. The bulletin covers specifications, operation and function of the device. Dimensions, schematic and operating diagrams, as well as ordering information, are included. *Minneapolis-Honeywell Regulator Co.*

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**FILM ON HYDRAULIC VANE-TYPE  
PUMPS IS FOLDER SUBJECT**

This descriptive folder describes a new 16 mm., sound color film, "Power-Up", about the latest types of hydraulic vane-type pumps. The 12-minute film shows how pumps, at pressures up to 2,000 psi., can improve power and efficiency of hydraulic circuits. Applications point out the importance of mobile equipment, field testing devices and many types of automatic and semi-automatic production machinery. *Denison Engineering Div., American Brake Shoe Co.*

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## **Your PRODUCT, too, is important to MATHEWS Engineers**

You, too, can have the benefit of well-planned mechanized handling in **your** plant. Mathews Engineers would like to work with you in developing a conveyer system which would create a smooth flow of **your** product through processing, warehousing, and shipping.

For up-to-the-minute materials handling, we believe you get the best when you buy equipment that is **Mathews engineered — Mathews planned — Mathews built** for you.



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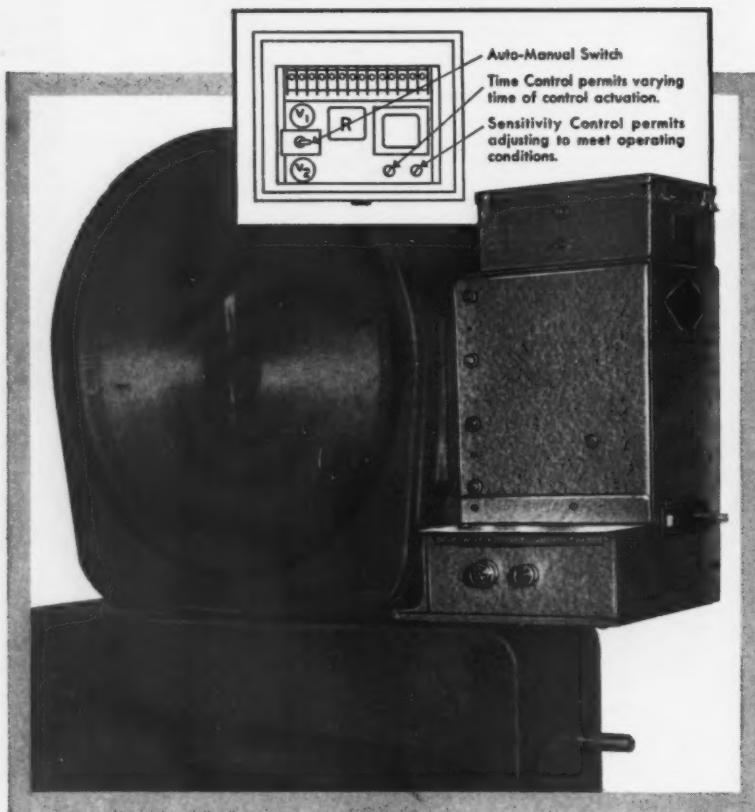
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# NEW Fairbanks-Morse

## Electronic Weight Detector



### Prevents incorrect weighing . . . stops costly errors!

With the new Electronic Weight Detector, true weight of any load can be automatically obtained and recorded without need of a weighman. Where a weighman is used, it is impossible for him to record incorrect weights or start a sequence at the wrong time. When desired, a flip of the switch can disengage the Weight Detector entirely from the system. *This is the first fully-reliable control of its*

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### FILTER ASSEMBLIES, REPLACEMENT ELEMENTS DETAILED IN CATALOG

Five standardized lines of high and low pressure T-type in-line filter assemblies, replacement filter elements, dual bowl filters and differential pressure indicator filter assemblies are described in this six-page catalog. The book includes a simplified selection procedure and ordering system and illustrates all filter assemblies and replacement elements with pictures and line drawings. *Bendix Filter Div., Bendix Aviation Corp.*

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### HAND FORGINGS AND THEIR USES IS BROCHURE SUBJECT

Hand forgings and their principal uses are discussed in this handsome 20-page brochure which lists complete availabilities, properties and engineering information for those produced by Kaiser Aluminum. The publication tells how metal, men, machines and methods are blended to achieve modern standards in this ancient art. Tables, charts, drawings and pictures supplement the text. *Kaiser Aluminum & Chemical Sales, Inc.*

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### SELECTION GUIDE FOR WELDING FITTINGS AND FLANGES

For engineers, purchasing agents and others who purchase welding fittings and flanges this 12-page booklet, FB-78, will prove a valuable guide to material selection of carbon, alloy and stainless steel welding fittings and flanges. It covers specifications and analyses, effects of alloying elements, mechanical properties and arc welding procedures, as well as general catalog information. *Tubular Products Division, Babcock & Wilcox Co.*

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### KIT AIDS IN SELECTING ADJUSTABLE SPEED DRIVES FOR EXTRUDING

How to modernize for profits in regard to selecting adjustable speed drive equipment for extruding is the theme of this complete kit. After analyzing the reader's present drive system it explains how to modernize. Facts on a speed variator, custom engineering systems, direct-current Kinematic motors and generators are included. *General Electric Co.*

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Work with your AIM\*...Pacific Clay Products does...  
**Steel Strapping unitizes pipe to cut handling costs**

Acme Idea Man  
 J. R. Roberts  
 works with many  
 firms to develop  
 improved  
 materials  
 handling and  
 packaging  
 procedures.



A better, faster, more damage-free method of handling and shipping their "Wedge-Lock" sewer pipe was sought by Pacific Clay Products, Stockton, California. Working with their Acme Idea Man, a system for unitizing pipe with Acme Steel Strapping and the new B5 Stretcher was developed. It proved to be the answer to their problems. (Idea No. S3-50)

Now twenty 8-inch pipes are unitized into a bundle that permits full use of mechanized handling equipment and allows important man-hour economies. Units can be stacked safely for storage yard efficiency, while inventory maintenance is simplified. Delivery schedules have been improved due to fast mechanical loading that allows more delivery trips per truck. Customers are pleased since damage is greatly reduced. Unitizing affords them man-hour savings, too, through fast unloading by lift truck.

\*Work with your Acme Idea Man. Call on his extensive materials handling and packaging experience for Ideas that can save you time, money and customer good-will. He's listed under "Steel Strapping" in the yellow pages of your telephone directory. Or write Dept. WCS-79, Acme Steel Products Division, Acme Steel Company, 4901 Pacific Boulevard, Los Angeles 58, California. Also San Francisco, Seattle, Portland.



**STEEL STRAPPING**

... for more details, circle No. 26 on Reader Service Postcard



# NEW EQUIPMENT

FOR WESTERN PLANT OPERATION, PRODUCTION AND MAINTENANCE



USE RIP OUT POSTCARD, PAGE 55, FOR MORE INFORMATION ON PRODUCTS DESCRIBED

## ENCLOSED GEAR DRIVES

... for speed reduction units through 125 hp.

These enclosed gear drives meet most requirements for speed reduction units 125 hp., and smaller, with output speeds from 780 to 1.2 rpm., at 1750 rpm. input speeds. They have Duti-Rated helical gears, heat-treated after cutting to obtain maximum hardness, give high capacity, great shock resistance and extra wear life. Space saving shaft-mounted reducers, for mounting directly on the



shaft for the driven equipment, are also available in ratings through 40 hp. *Wagner Electric Corp.*

... FOR MORE DETAILS, CIRCLE NO. 200

## ELECTRONIC WEIGHT DETECTOR

... assures correct weight without visual observation

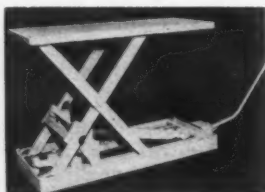
Planned to provide a bridge between manually-controlled and truly automatic weighing processes, this new electronic weight detector assures correct weighing without visual observations. It can definitely determine that correct weight has been reached before allowing weight to be recorded; read-out equipment to be operated, or controls for conveyors, hoppers, mixers and other machinery to be operated. *Fairbanks, Morse & Co.*

... FOR MORE DETAILS, CIRCLE NO. 201

## HYDRAULIC POWERED LIFTABLE

... three models with capacities from 1,500 to 6,000 lb.

This hydraulic powered scissor arm supported table lift comes in these platform sizes and lifting capacities: 6½ x 36 in., 1,500 lb.; 6½ x 38½ in., 3,000 lb., and 7 x 40 in., 6,000 lb. Oil-hydraulic cylinder is powered by an electric motor and pump unit self-contained within the structural



framework of the lift. Lightweight, it's available with caster wheels and dolly mounting for ready maneuverability. *Globe Hoist Co.*

... FOR MORE DETAILS, CIRCLE NO. 202

## LATEX CEMENT PATCH

... for concrete and masonry repairs

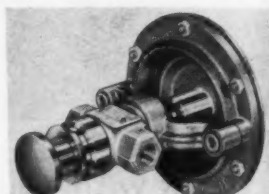
This new, fast self-curing, easy-to-mix latex cement patch product for repairing everything from a crack to a big hole in concrete or masonry, assures a tight, non-shrinking bond, tough, non-brittle toppings, and reduces shrinkage to a minimum. Latex cement patch consists of latex (liquid binder) and powder (dry, premixed cement and fine aggregates) supplied in complete packages of 5, 10 and 40 lb. *The Flintkote Co.*

... FOR MORE DETAILS, CIRCLE NO. 203

## AUTO-MANUAL CONTROL VALVE

... can prevent accidental manual actuation

Designed for automatic interlocking of manually controlled circuits or manual operation of an automatically-operated system, this valve for air, oil or vacuum service is available with 2, 3 or 4-way valve bodies. Port sizes range from ¼ through 1 in. NPT and flow area is said to equal nominal pipe size. For 20 to 60 psi. air actua-

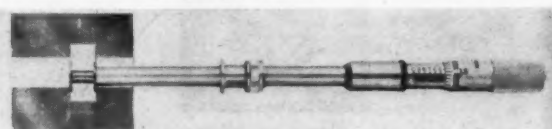


tion, 15 psi. instrument pressure, it will handle intermittent actuation pressures up to 125 psi. *Valvair Corp.*

... FOR MORE DETAILS, CIRCLE NO. 204

## INTERNAL MICROMETER

... "Multi-Mike" is simple, yet accurate



Measurements accurate to .0005 in. are possible from .050 to 1.050 in. for groove widths; from zero to 1.000 in. for lands and distances between grooves with this internal micrometer. Other applications include O-ring and keyway width and location measurements. From an external reference point, the current model can locate accurately to the full length of its 5¾ in. probe. *Navan Products, Inc.*

... FOR MORE DETAILS, CIRCLE NO. 205



TAKING GUESSWORK OUT OF PACKAGING DECISIONS



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Want an objective analysis of your present packaging operation? These crack equipment engineers will come into your plants and give you a complete report, plus recommendations. This is part of a Fibreboard program designed to help you make the best possible packaging decisions.

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PAPER PRODUCTS CORPORATION San Francisco

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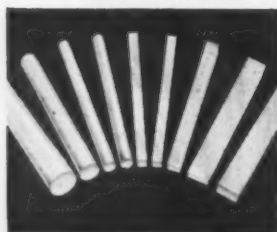
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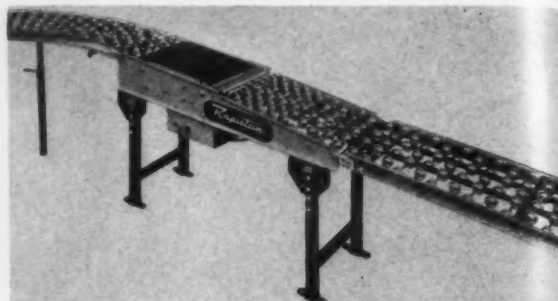
**11 WAREHOUSES COAST-TO-COAST**

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60

#### FLOW CONTROL REGISTER

... counts boxes as they pass on conveyor system



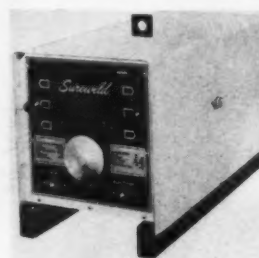
For counting cartons, cases and boxes as they pass along a conveyor system, this flow control register features a combination of mechanics and electrical circuitry that makes accurate counts possible without need to space individual objects on the line. Approximate weight of the register is 275 lb., and it comes in 5-ft. lengths which fit into a material handling system. *Rapids-Standard Co., Inc.*

... FOR MORE DETAILS, CIRCLE NO. 206

#### HORIZONTAL ELECTRIC ARC WELDERS

... featuring high open-circuit voltages

Available in 8 models, these compact new a-c. and a-c.—d-c. welders provide easy arc striking, excellent arc stability and faster, easier welding. All models feature a movable core (shunt) design and a heavy-duty "on-off" switch on the front of the control panel. Weights range from about 130 to 445 lbs.; heights



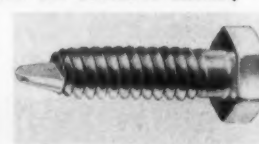
from 17 to 25¾ in.; widths from 12¼ to 19 in., and depths from 20½ to 41 in. *National Cylinder Gas Div., Chemetron Corp.*

... FOR MORE DETAILS CIRCLE NO. 207

#### SELF-DRILL, SELF-TAP SCREW

... for power driving, both manual and automated assembly

Because this new fastener makes its own hole it eliminates many drilling, positioning and hole matching problems and can bring substantial cost savings in various operations. These screws can be preassembled with plain, special, lock and sealing washers for special applications. They are avail-



able now in a limited range of sizes for trial use by manufacturers. *Reliance Div., Eaton Mfg. Co.*

... FOR MORE DETAILS, CIRCLE NO. 208

#### HEAVY-DUTY LIMIT SWITCHES

... with side plungers so they can "lie down"

Side plungers (available with or without roller) allow these four new heavy-duty limit switches to "lie down" in cramped quarters around cams and slides. Actuator heads can be rotated to face in four directions, and rollers on roller-plunger actuators can be locked at any angle with respect to the switch centerline. Contact arrangement is 2-circuit double break, and all are oiltight assemblies with respect to the switch centerline. *Micro Switch, div. of Minneapolis-Honeywell Regulator Co.*

... FOR MORE DETAILS, CIRCLE NO. 209

# IT PAYS TO RELY ON A SPECIALIST



**A Mobil Program  
of Correct Lubrication  
Provides Management  
with:**

- ★ **Accurate Diagnosis**
- ★ **Advanced Methods**
- ★ **Proven Products**

You call on a specialist to perform an operation. Why not call on a specialist to make your operation perform? For 93 years, Mobil has been industry's lubrication specialist.

A Mobil Correct Lubrication Program provides management with planned lubrication on a sound engineering basis. New methods combined with proven products can help you cut costs — improve efficiency. Your qualified Mobil lubrication specialist can assist you in many ways with problem analysis, new techniques, laboratory service and personnel training.

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## MOBIL CORRECT LUBRICATION



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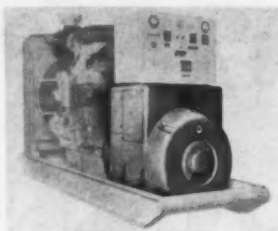
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61

#### PACKAGE BRUSHLESS GENERATOR

... permits direct mounting of switchboard on top of unit

Shorter and streamlined in appearance, this generator designed to eliminate sparking has its auxiliary equipment mounted within the yoke enclosures. Instruments are at readable height, placed in a side recess, which also shelters the voltage regulator. Conduit energy can be made from left or right hand. Design permits two-bearing arrange-



ments for belted or direct coupling to any motor or engine. *Allis-Chalmers Mfg. Co.*

... FOR MORE DETAILS, CIRCLE NO. 210

#### PREFABRICATED PLYWOOD SHED

... quickly put up, taken down, relocated

Called Porta House, this prefabricated plywood outdoor storage shed, available for immediate delivery and ready for bolted assembly, converts dead yard space into work area. It may be used as a storage shed, field office, or to expand present facilities. Sizes are 6 ft. or more x 9 ft. or more—from 54 sq. ft. to 10,000 sq. ft. Doors and windows may be positioned where desired. Designed to be quickly assembled and disassembled by unskilled labor, it is light enough to be moved from place to place (disassembled) by pick-up truck. *Ridgely K. Dodge.*

... FOR MORE DETAILS, CIRCLE NO. 211

#### EXTRA HEAVY-DUTY GRINDERS

... in three sizes, for grinding odd-shaped parts

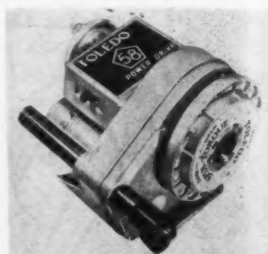
Rigid and powerful, these extra heavy-duty grinders are available in  $\frac{1}{2}$ ,  $\frac{3}{4}$ , and 1 hp. Cast iron tool rests are adjustable for height, angle and distance from wheel, and extended frame construction permits grinding large odd-shaped parts. Wheel guards drilled for eyeshields have exhaust outlets and spark shields. Switch is recessed. Full ball bearing construction is lubricated for life. Also available is a new heavy gage welded steel construction pedestal designed for use with the grinders. *Stanley Electric Tools, division of The Stanley Works.*

... FOR MORE DETAILS, CIRCLE NO. 212

#### LIGHTWEIGHT POWER DRIVE

... for pipe from  $\frac{1}{8}$  to 2 in., rod  $\frac{1}{8}$  in. and longer

Only 73 lb. in weight, this new power drive has a spin torque chuck with enclosed round jaws that cuts down chances of chips falling into moving parts or other mishaps. An easily removable motor, a sealed factory-lubricated gear train, a safety factor switch are among other outstanding features for the drive that can be bench or stand-mounted in any position



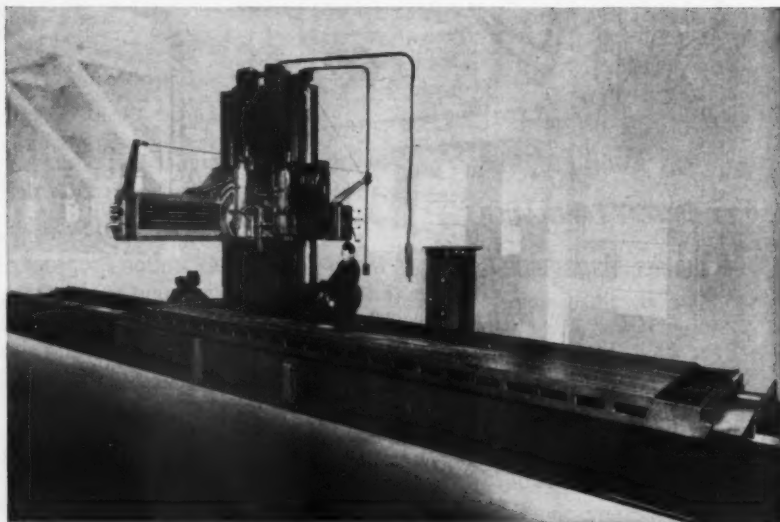
through 360 deg. *Toledo Pipe Threading Machine Co.*

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# MOORE FACILITIES

## Giant Planer Cuts Machining Cost

Cut costs! Speed production! Moore does both with a heavy duty openside planer. It's part of the all-inclusive machining facilities at Moore which emphasize use of special and heavy duty tools, such as large vertical and horizontal boring mills, lathes, grinders, and many others. Let your machining job benefit from Moore's 50 years of experience. Consult Moore... for one-stop, one-shop machining requirements.



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#### REFRIGERATION MACHINES

... for 400 to 800-ton operating capacity

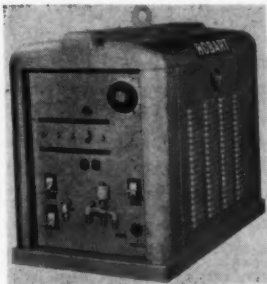
This line of 2-stage Tonrac refrigeration machines for applications requiring 400 to 800-ton operating capacity is designed specifically to provide chilled water for air conditioning of large buildings and factories, but is also adaptable to heat pump applications. The unit, Series 235, operates on Refrigerant 11. An outstanding feature is its quiet, vibrationless operation as it maintains a constant chilled water temperature over the complete load range. Capacity is varied by adjustable inlet guide vanes; load control is completely automatic. *American Standard Industrial Division.*

... FOR MORE DETAILS, CIRCLE NO. 214

#### COMPACT PACKAGE DEAL

... for tungsten-inert-gas shielded arc welding

Complete, remote, tungsten-inert-gas shielded arc welding facilities combined in one compact, lightweight package make up Tigpak, a unit designed to eliminate the need for moving heavy arc welding equipment and extending water lines for remote welding jobs. Easily carried, hoisted, or trundled to the job, the unit contains all essential accessories for "TIG" welding. *Hobart Brothers Co.*



*Hobart Brothers Co.*

... FOR MORE DETAILS, CIRCLE NO. 215

#### NEW 3M FINISHING MATERIAL

... produces unique finish at lower cost

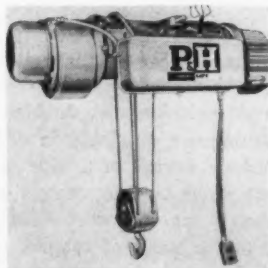
A new finishing material that produces a unique finish on fabricated metals at lower cost than with other methods—and may also reduce time and costs in the pickling operation—is made of nylon web impregnated with fine grades of abrasive material. Now in use on stainless steel and aluminum, this Scotch-Brite brand material has also been used successfully on zinc, brass and other non-ferrous metals. *Minnesota Mining & Mfg. Co.*

... FOR MORE DETAILS, CIRCLE NO. 216

#### HEAVY DUTY ELECTRIC HOISTS

... with lifting capacities from 2,000 to 50,000 lb.

Said to be the most complete line of standard, wire rope electric hoists offered, this line includes models with lifting speeds from 10 to 20 fpm., to a high range of 20 to 100 fpm. Height of lifts ranges from 15 to 100 ft. Motors are available in single, two or variable speed. Lug, hook, plain, hand-gear or motor driven trolley



mountings, as well as base, wall, ceiling, and deck mountings are offered. *Harnischfeger Corp.*

... FOR MORE DETAILS, CIRCLE NO. 217

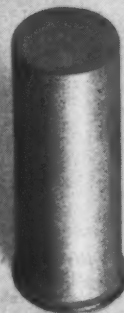
WESTERN INDUSTRY/JULY 1959

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(made from Bronze or Monel powders)



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Asco produces the World's Largest Porous Metal Filter Elements, Self-Lubricating Bearings, Machine Parts, and Soft Iron Magnetic Parts.

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SAFE...  
SILENT...**

## **ELECTROLIFT WORM-DRIVE HOISTS**

Dependable, long-lasting ElectroLift hoists are used by the thousands in America's largest manufacturing plants. Features of these units—ranging from 1/4- to 10-ton capacity—include:

- Worm-drive design for safe, sure braking action
- Use of quality components and materials for trouble-free performance
- Fully enclosed motor and gearing for clean, quiet operation
- Greater compactness for close headroom, safer action

For details on speed, models and operation, consult your classified directory for the ElectroLift representative nearest you.



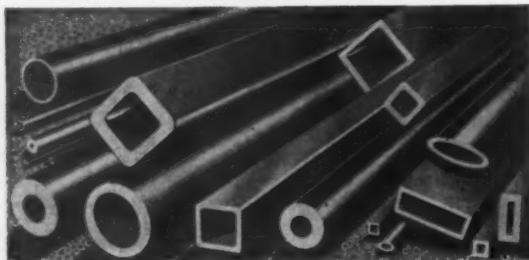
**204 Sargeant Avenue**

**Clifton, N. J.**

... for more details, circle No. 32 on Reader Service Postcard

## **TUBING**

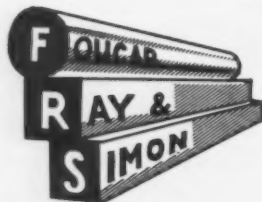
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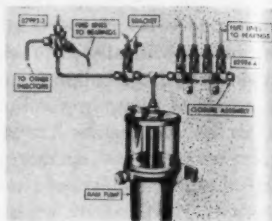
**SAN FRANCISCO 7, CALIF.**

... for more details, circle No. 33 on Reader Service Postcard

### **MINIATURIZED LUBRICATING SYSTEM**

... for maintaining constant oil film with no overflow

Called the Micro-Measure system, this miniaturized injection system pre-measures and injects fluid lubricants to "millionths of an ounce" in automatic cycles as often as every minute. Designed for lubrication of production machinery, it has been successfully used in textile processing, metalworking, packaging and other industries at very low



cost, according to the manufacturers. *Lincoln Engineering Co.*

... FOR MORE DETAILS, CIRCLE NO. 218

### **MATERIAL HANDLING PUMPS**

... use less air, offer better material flow

Material handling pumps that use less air but offer better material flow will handle virtually any job calling for the use of heavy material, paint, and buffing compounds. Called the Pacer series, it includes the Pacer 25, 2 1/2-1 ratio, to handle medium heavy materials from buffing compounds to automobile sound deadeners, and Pacers 40 and 60, designed for heavy materials such as cold process roofing, sound deadening material, mastic, etc. *Binks Manufacturing Co.*

... FOR MORE DETAILS, CIRCLE NO. 219

### **LOW-COST HELIWELDING OUTFIT**

... tungsten-inert gas welding kit for small shops

The new heliarc 100, a low-priced tungsten inert-gas welding outfit, is specifically designed to be used by small sheet metal fabricators, auto repairmen, plumbers, and in small companies where the manual Heliwelding equipment can be profitably applied. The kit, which can be operated from any conventional d-c. power source, is ideal for producing quali-



ty welds on light gage stainless steel, aluminum, brass, copper, nickel, monel, silver, and all other non-ferrous metals. *Air Reduction Pacific Co.*

... FOR MORE DETAILS, CIRCLE NO. 220

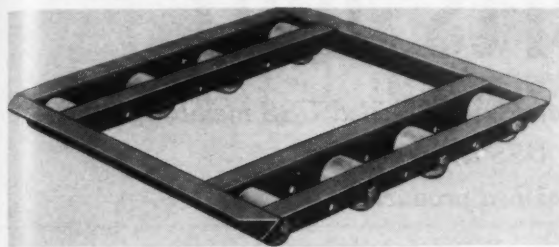
### **MULTI-PURPOSE STORAGE CABINET**

... with double doors, adjustable shelves

A multi-purpose, double door storage cabinet designed to improve efficiency in offices and plants provides safe, orderly storage of a wide range of items. All shelves are adjustable on 2-in. centers without tools. Any number of shelves may be ordered, in addition to the four supplied with the standard cabinet, up to a maximum of sixteen. Constructed of heavy gage steel, welded at vital points, and securely bolted by a concealed method so that no boltheads or projections show on the cabinet exterior, the cabinet has a cornice top at the front. *Alan Wood Steel Co., Penco Division.*

... FOR MORE DETAILS, CIRCLE NO. 221

**STEEL FRAME PALLET DOLLIES**  
... for straight line push or 360-deg. movement



For either straight line push or 360-deg. movement, these steel frame pallet dollies speed up handling, simplify loading and unloading by keeping goods mobile in areas where fork trucks cannot operate or are not available. Frames have multiple axle holes to accommodate 4, 6, 8 or 10 rollers, with an extra high hole at each end for on-the-job conversion to and from tilt or non-tilt style roller arrangements. *Nutting Truck & Caster Co.*

... FOR MORE DETAILS, CIRCLE NO. 222

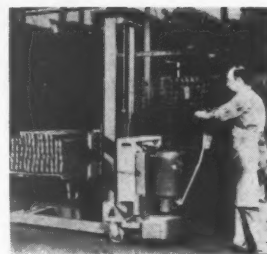
**AIR-ACTUATED WIRE STITCHER**  
... for automatic equipment or manual stitching

Said to save 65 to 80% in fastener material costs, this air-actuated wire stitcher for assembling or packaging work accommodates wire in sizes from No. 27 to 25 round and 21 by 25 flat. A small compact unit for use in automatic equipment or for manual stitching on a continuous or non-repeat basis, it is easily mounted, can be positioned to stitch downward or upward, horizontally or at any angle. *Acme Steel Co.*

... FOR MORE DETAILS, CIRCLE NO. 223

**NEW PLATFORM HI-LIFT**  
... provides full use of cube space

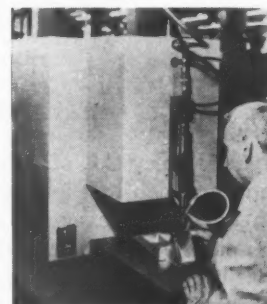
Ideal for stacking skids and box loads of materials to upper levels or for handling sheet stock or other bulky items not adaptable to pallets, this newly redesigned platform hi-lift truck has capacities of 4,000 and 6,000 lb. It is available in all popular mast lift heights, including telescopic. *Barrett-Cravens Co.*



... FOR MORE DETAILS, CIRCLE NO. 224

**FEEDER-DRIVER FOR SET SCREWS**  
... gun-type, portable machine

Designed to automatically feed and drive as many as 2,000 standard socket screws per hour, this portable feeder-driver comes in three models—for size No. 4 to 8 diameter set screws; for size 10 to 5/16 in., and for sizes 3/8 to 1/2-in. diameter. The machine can be moved from one location to another. *The Bristol Co.*



... FOR MORE DETAILS, CIRCLE NO. 225

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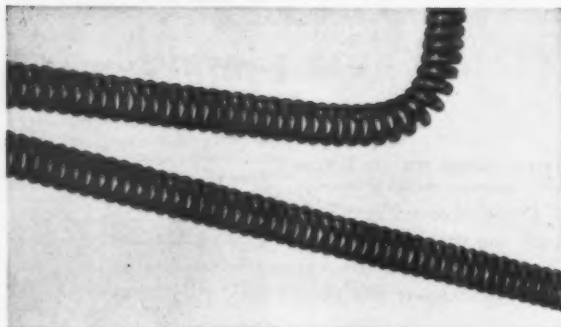
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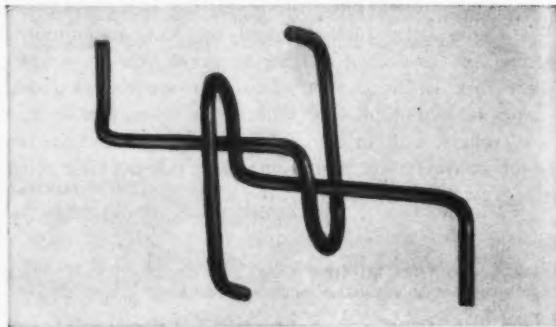
# Wire Experts Quiz

*For each of these prominent Western manufacturers, skilled USS metallurgists recommended the one right USS wire for the job.*

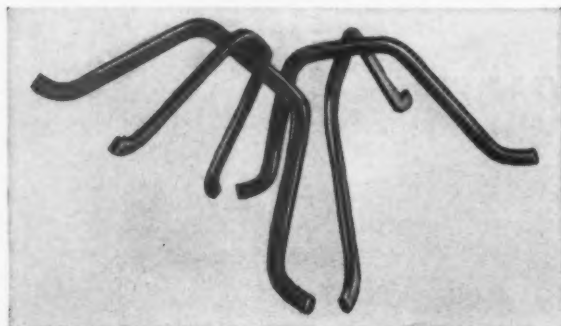
*Can you name the finished product?*



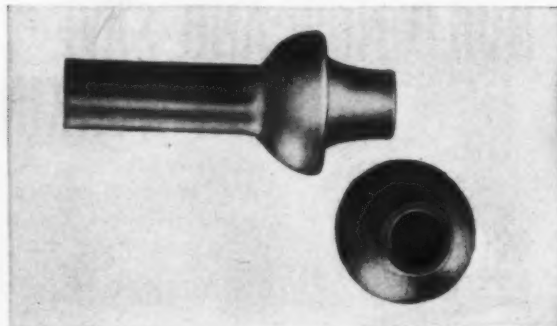
**1** Lee Healey Co., of Glendale, California, wanted a uniform high tensile wire to withstand severe forming and meet exacting tolerances on high-speed, automatic equipment. 12 ga. USS Gal. Premier\* Spring Wire served these rigid requirements exactly. The product: Plumber's snakes.



**2** Rockwell-Standard Corp., Seating Division, of Los Angeles, California, needed a wire with superior surface finish and uniform tensile, to insure satisfactory cold forming and good clean welds. The order was filled on all four counts with 4 ga. USS Clean Bright Basic Wire. The product: Auto seat facing fasteners.



**3** Rehrig Pacific Co., of Los Angeles, California, called for a high strength, low carbon wire, soft enough for flattening, cold forming and subsequent spot welding. The right wire for the job was 7 ga. USS Soft Basic Wire. The product: Separators for dairy bottles in milk crates.



**4** Milford Rivet & Machine Co., of Norwalk, California, required a ductile wire to take severe upsetting, drilling and still maintain its strength to exacting specifications. The problem was solved with .181 USS Drilled Tubular Rivet Wire. The product: Chair glide studs.

\*USS and Gal. Premier are registered trademarks

Are you using the right wire for your production needs? USS metallurgists are constantly tailoring new wire for Western industry. For a review of your wire requirements (no obligation, of course), write our Wire Service Dept. W1-7, Room 1260, 120 Montgomery Street, San Francisco 6, California.



**Columbia-Geneva Steel  
Division of  
United States Steel**





# WESTERN INDUSTRY

# NEWS

THE INDUSTRIAL WEST . . . ON IT'S WAY

PLANTS • PRODUCTION • DISTRIBUTION • PERSONNEL

## **\$3,000,000 Gypsum Facility for New Mexico**

ALBUQUERQUE—A \$3,000,000 gypsum plant to manufacture gypsum building products such as wall board, lath and plaster board, will be built near here by the American Gypsum Co., a newly-formed corporation.

Scheduled to get under way in September, the plant will take gypsum from the White Mesa gypsum deposit, a 1,180-acre deposit near Ysidro, about 30 miles northwest of Albuquerque.

The plant is expected to be completed and in production by late 1960, employing about 80 persons maintaining a 24-hour shift at the plant.

## **Gates Rubber Plans New Warehouse in Northwest**

PORTLAND—A 50,000-sq. ft. warehouse and regional distribution center is under construction by Gates Rubber Co. in the Rockwood industrial district here. The \$350,000 facility, scheduled for October occupancy, will be a distribution point for smaller warehouses in Seattle, Billings, San Francisco and Salt Lake City.

Located on a 3½-acre site, the new warehouse is designed so it can be doubled in size.

Bill Elliott, manager of Portland branch operations, will be in charge of the new warehouse. Ken Burgess is Northwest district manager of the company's industrial division.

Gates, sixth largest rubber manufacturing firm in the nation, produces tires, tubes, V-belts and moulded rubber products.

## **Nevada Board Studies Industrial Development**

CARSON CITY, NEV.—A 17-man state board of economic development will join in the statewide search for new industry, according to Jack Lehman, director. The chief job of the department will be to follow up on leads concerning interested industries, forwarded by other interested groups or individuals, beginning at the county level.

## **National Can May Build Plant in Vancouver**

VANCOUVER, WASH.—Negotiations are reportedly under way by National Can Co. for establishment here of a \$1,000,000 can manufacturing plant and distribution warehouse. This would be the first facility in this area for the Chicago firm, the national's third largest company of its kind.

Site of the proposed plant is on W. 26th St., on a tract formerly owned by Beard Fruit Co.

## **Cyclops Iron Breaks Ground for Expansion**

SAN FRANCISCO—Ground breaking ceremonies recently marked the start of a major expansion program for Cyclops Iron Works, manufacturer of refrigeration equipment. The pioneer San Francisco firm has begun construction on a 45,000-sq. ft. plant on Jennings St., in Candlestick Industrial Park, that will replace its present facilities at 837 Folsom St.

Scheduled for occupancy in October, the new facility will include space for offices, manufacturing, service and display rooms, plus a 14,000-sq. ft. parking lot.

Cyclops, founded in 1873 as a general machine shop, was the West's first manufacturer of overhead traveling cranes, gantry cranes and hoists. The first crane built in the 1890's was shipped to Honolulu where it is still in use.

## **Crown Zellerbach Studies Denver Area For Mill Site**

DENVER—Crown Zellerbach Corp. has revealed it is considering establishment of a newsprint mill in this area to supply customers in the Mountain States region. Although intensive studies are beginning this summer, if the company decides to build the mill, the project would take two or three years to complete.

Although Crown Zellerbach produces sufficient newsprint for its customers in the West, the company believes that the long range outlook for the whole West, and growth prospects in this area, justify the site study.

## **Western Corrugated, Inc., Completes New Plant**

COMPTON, CALIF.—A new corrugated container plant with a production potential of 4 to 5,000,000 containers monthly has been completed here by Western Corrugated, Inc.

The 100,000-sq. ft. facility which, with equipment, cost approximately \$1,000,000, is the first of a series of industrial plants to be located in Rancho San Pedro, a 1200-acre industrial area under development.

With the new facility Western Corrugated has a completely integrated forest production operation producing lumber, plywood, veneer, pulp paper and shipping containers. Since 1955 the firm has completed a multi-million dollar pulp and paper mill in the Northwest and three other container plants in Washington, Oregon and California.

## **Wyoming Sites Considered for \$10,000,000 Gypsum Mill**

CHEYENNE, WYO.—Vipont Mining Company is considering building a \$1,000,000 gypsum mill at either Lander, Riverton or Shoshoni in Wyoming, according to Alfred Ellerby, president.

The plant would manufacture wall-board and plaster from the vast gypsum deposits on the Wind River Indian Reservation, he stated.

## **Montana Power Acquires 3,300 Acres of Coal Lands**

BUTTE, MONT.—Purchase of vast coal deposits near Colstrip, 100 miles east of Billings, has been announced by the Montana Power Co. The 30-year lease was signed by the Northern Pacific Railway.

About 3,300 acres of railway coal lands and the town of Colstrip itself are involved in the acquisition.

Purchase of the deposits, said J. E. Corette, president and general manager of Montana Power, "should have the effect of making electric power available in Montana throughout the indefinite future at low cost, as compared to power costs in most other parts of the nation."

GEARS FOR INDUSTRY  
**THE Lufkin LINE**  
OIL FIELD PUMPING UNITS

## at the TULSA OIL SHOW

Can you imagine a portable crane with a 250' boom? Alongside an average 150' height limit building in downtown Los Angeles, this crane would tower above any structure with the possible exception of the City Hall. P. & H. says it's the **WORLD'S LARGEST**. It also caused more stiff necks than a rocket launching at Cape Canaveral.



V. J. Fawcett

Cummins Diesel exhibited the **WORLD'S LARGEST** flatbed truck, 16' wide and 41' long, complete with navigational equipment for oilfield service in the vast uncharted desert wastelands of the Sahara. Vehicle should have excellent adaptability in Los Angeles area during smog attacks, and also on our freeways—it can straddle the dividers!

Also outstanding was National Supply's exhibit showing the **WORLD'S LARGEST** drilling rig with a mast 152' high and a rotary table powered by an electric drive of approximately 2,400 HP. This rig is rated to drill to a depth of 25,000'. The driller's control panel for this rig looked something like a cross between the keyboard of a Hammond organ and the dashboard of a 707 Jet.

To pump all the deep wells made possible by these new powerful rigs, Lufkin naturally presented the **WORLD'S LARGEST** pumping unit. Bigger than "The Blob", our machine stands 47' high to the top of its horse-head and weighs 80,000#. Stroke length 20'. If only somebody will come up with a 60,000# polish rod, it can handle that too. The kids all thought it was a great exhibit, with three little peewee units mounted on the monster's walking beam. Parents were plagued with pleas of their progeny to purchase the peewee pumps, but when the show closed, Pete Little reported parents' promises pooped out because the kids settled for popsicles.

*V. J. Fawcett*

**Lufkin** FOUNDRY  
& MACHINE COMPANY

... for more details, circle No. 35

## Construction on Hawaiian Pipe Facility Under Way

OAHU, HAWAII—Another major manufacturing facility—one that is scheduled to deliver its first products in August—is under construction in the Campbell Estates Industrial Tract at Barber's Point.

The new plant is a steel pipe fabricating and processing operation being built by the Southern Pipe Division of U. S. Industries, Inc., Azusa, Calif., first mainland firm to start such a project since statehood was approved.

Delivery of the first pipe will fulfill Southern Pipe's recently awarded \$600,000 contract with the City and County of Honolulu that provides for several miles of large diameter cement-mortar lined and coated steel pipe to be installed between Ewa and Waianae.

Southern Pipe also plans to expand its facility here as rapidly as possible to make available a complete range of pipe sizes from 4 to 48 in., with all types of coatings and linings.

## Columbia-Geneva in Utah to Install New Coal Dryer

WELLINGTON, UTAH—R.M. von Storch, general superintendent of Coal Mines

and Quarries for Columbia-Geneva Steel Division, has announced a new coal drying facility will be installed here to supplement the division's 13-story coal cleaning plant which went into operation a year ago.

The dryer is capable of processing about 800 tons of coal an hour and will greatly improve the quality and quantity of coke produced at Geneva, von Storch said. Drying will also minimize freezing of coal which sometimes occurs in the railroad cars during winter months.

## Motorola Reveals Further Expansion Plans in Arizona

PHOENIX, ARIZ.—Plans for a further 500,000-sq. ft. addition to its semiconductor division were revealed by Motorola, Inc., at recent dedication ceremonies for a 129,000-sq. ft. building at its plant here. The proposed addition, said Dr. Daniel E. Noble, executive vice president, will add substantially to the firm's electronic operations in Arizona.

## New Harvey Offices

BERKELEY, CALIF.—Bay Area sales engineering offices of Harvey Aluminum of Torrance, Calif., have been moved into larger quarters at 2015 Center St., Berkeley.

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**TON-TEX** CONVEYOR AND TRANSMISSION **BELTING**

... for more details, circle No. 36 on Reader Service Postcard

### Boston Gear Distributor



SEATTLE—Pictured above is a new distributor for Boston Gear Works in the Pacific Northwest, the Campbell Industrial Supply Co., 3433 Airport Way.

The new distributor will offer both sales and technical assistance on the complete Boston Gear Line. This includes gears, sprockets and chains, speed reducers, bearings, pillow blocks, shaft supports, couplings, and pulleys.

Boston Gear has another distributor located in Seattle, Cragin and Co., 932 First Ave. So., and a resident representative, William Butler, 1835 116 N. E., Bellevue, Wash.

### Long-Bell Starts Work on Wood Processing Center

CHELATCHIE, WASH. — Construction was started recently near here by Long-Bell Division, International Paper Co., on a new wood processing center that will eventually replace the firm's present ply and lumber mills at Longview, Wash.

The \$5,000,000 facility is scheduled to be in operation in July, 1960. First unit will be a plywood plant for which equipment is scheduled to be installed starting in November.

Long-Bell will continue its several other operations in Longview, where division offices are located.

### Kennecott Copper Adds to Arizona Facilities

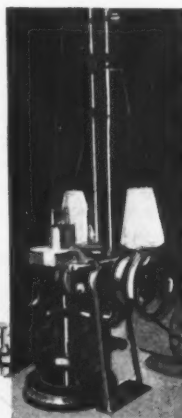
HAYDEM, ARIZ.—New milling transportation and storage facilities for Kennecott Copper Corp., third and final major step in a \$40,000,000 expansion program, were announced recently.

Included in the new work announced is relocation of railroad tracks at Ray, a new siding here, construction of a 7,500-ton ore bin at Ray and a 28,000-ton bin here. Five ore crushers, two grinding sections and additional leach-precipitation-flotation process equipment will also be built.

Purchase of 124 rail ore cars of 100 tons capacity will also be included, along with new ore conveyor systems.

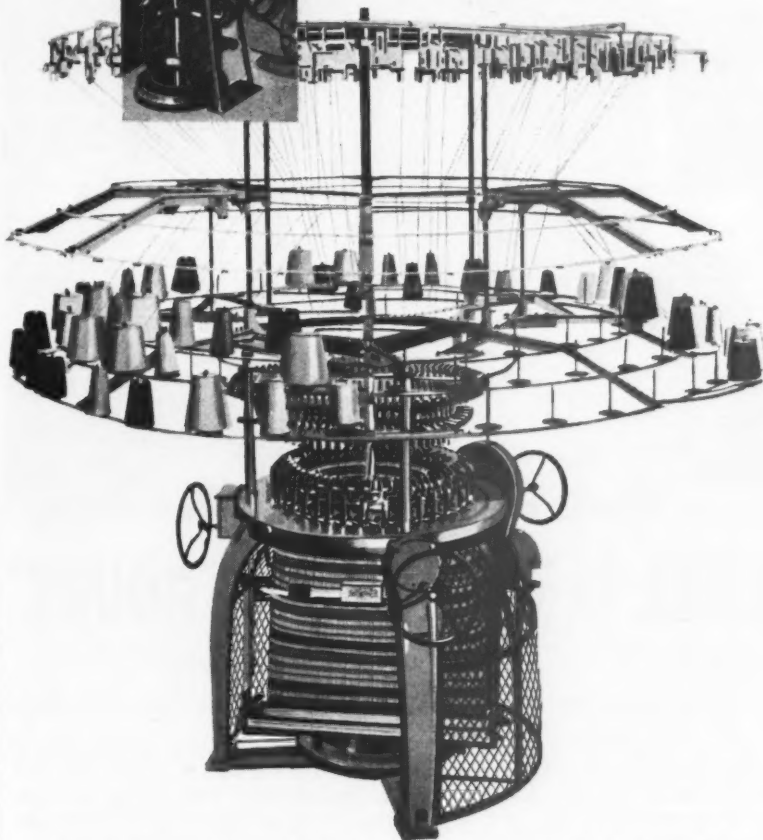
## An essential tool of the knit apparel industry...

### The Needle Used in Knitting Machines



**SMALLEST MACHINES** use 5 to 10 needles with each performing its job 240 times per minute to knit tubing  $\frac{1}{8}$  to  $\frac{3}{8}$  inches in diameter depending on the yarn used.

**LARGEST MACHINES** utilize 1,500 needles...each performing its job 534 times per minute to knit tubing 23 inches in diameter in a varied assortment of colors of a predetermined pattern.



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#### ...modern banking services

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the business-minded bank  
serving the Industrial Center of the West.

# California Bank

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## Wire Association Men Tour C F & I Plant

SAN FRANCISCO—One of the steel industry's most widely used products—wire—and how it's made at the South San Francisco plant of Colorado Fuel & Iron Corp. was studied and discussed by members of the Wire Association when they toured the firm's expanded facilities during their recent West Coast Regional Meeting. About 175 members of the group registered for the two-day session, which had headquarters at the Fairmont Hotel.

A highlight of the second day's meeting, the plant inspection trip took the wire men through the storage area

where the basic source of supply, rod from the CF&I Pueblo, Colo., plant is received and stored, and on through the various processes in which the rods are drawn through a series of dies, each one with a smaller opening, so that it is reduced in diameter and increased in length. They saw the annealing and galvanizing operations by which the desired temper and coating required for finished products is obtained. Packaging, shipping and other facilities were also inspected.

In an expansion program completed last November, the South San Francis-

co plant added 44,000 sq. ft., increasing its total area to 132,000 sq. ft. Personnel added as the result of the expansion, which increased tonnage capacity by 25%, brings current employment to about 170 production people on a 21-turn, 7-day week basis. Capacity is 5700 tons monthly.

Major equipment installations were three high-speed heavy duty machines for producing wire 12-gage and finer, and one for wire 23-gage and finer.

A technical session took up the first day of the regional meeting, for which Lloyd W. Albright, wire and special products sales manager for CF&I's Pacific Coast Division, was program chairman. Papers presented were "Bolt and Nut Specifications," by J. L. Humphrey, Bethlehem Pacific, Los Angeles; "Heat Treating of Steel Wire," by Richard T. Merrell, E. F. Fredrick and G. R. Decker, Columbia-Geneva, Pittsburg; "Storage and Shipping of Wire and Wire Products," L. J. Welsh, Colorado Fuel & Iron.

"Heat Treating of Finished Wire and Wire Products," Ben Berlein, Industrial Steel Treating Co., Oakland; "Plating of Wire and Wire Products," Don Stewart, Industrial Hard Chrome Co., Oakland, and "Spring Wire," by Ward Dobbin, Simmons Co., San Francisco.

Other highlights of the session were a luncheon at the International Inn following the plant tour and a dinner at the Fairmont attended by some 200 persons.

Among national officers of the Wire Association at the meeting were Allan B. Dove of Hamilton, Ont., Can., president, and two Western directors, Earl R. Potter, Industrial Wire Products Corp., Los Angeles, and William Mohr, CF&I, Oakland.

Members of the program committee serving with Mr. Albright were V. A. Barbata, Bethlehem Pacific; J. F. Hawley, E. H. Edwards Co., W. H. Fish, D. H. Kofahl and R. L. Noble of Colorado Fuel & Iron, and R. W. Payne, Columbia-Geneva.

### Thompson Ramo Wooldridge Plans \$2,000,000 Facility

LOS ANGELES—Construction plans for a \$2,000,000 aircraft and missiles component plant were announced this month by Thompson Ramo Wooldridge, Inc. The new 120,000-sq. ft. facility, to be started in September, will be used to consolidate and expand the firm's West Coast operations for the Tapco group's division, which manufactures hydraulic hardware, structural aircraft and rocket motor cases. The group currently operates in Long Beach and Bell, Calif. These plants will close when the new plant is completed.



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## A. O. Smith Opens Branch Plant in Newark, Calif.

NEWARK, CALIF.—A new Western plant for A. O. Smith Corp., Kankakee, Ill., started production in June at 13771 Sycamore St. The facility is a 250,000 sq. ft. plant acquired in 1957 from Rheem Mfg. Co.

The Western facility produces Permaglas water heaters, formerly manufactured only at Smith's headquarters plant. According to J. H. Brinker, vice president and manager of the Permaglas Division, production capacity will be 10,000 units monthly on a one-shift basis. This could be upped to 25,000, when warranted.

The new facility, located on a 21-acre site adjacent to the Southern Pacific main line, was entirely remodeled before operations began. Numerous buildings were torn down and a 16,000-sq. ft. addition was built.

Also housed at the new plant is one of two Pacific area branches of the product service division, which handles distribution of replacement parts for many of the company's products, which include electric motors, welding machinery, furnaces and air conditioning units.

## Libbey-Owens-Ford Buys 870-Acre Site Near Stockton

STOCKTON—Purchase of an 870-acre parcel of land near Lathrop, south of here, has been revealed by Libbey-Owens-Ford Glass Co. of Toledo, O. Acquired through the Southern Pacific industrial development department, the land was reported to be the proposed site of a large glass-manufacturing plant, although L-O-F officials would give no definite statement concerning their plans.

## Hamerslag Appointed

SOUTH SAN FRANCISCO — Hamerslag Equipment Co., 110 Freeway Blvd. has been named a distributor for Tubar material handling equipment made by Uhrden, Inc., of Denison, O. Hamerslag will handle that firm's unloaders, dumpers, work positioners, lifts and cranes in Northern California and part of Nevada.

## Pierce Opens Third Plant

PORTLAND—Completion of a third manufacturing plant has been announced by Pierce Trailer & Equipment Co. The new facility is the first of three to be built on a 14-acre site on Sandy Blvd. All manufacturing operations will later be moved to this location.

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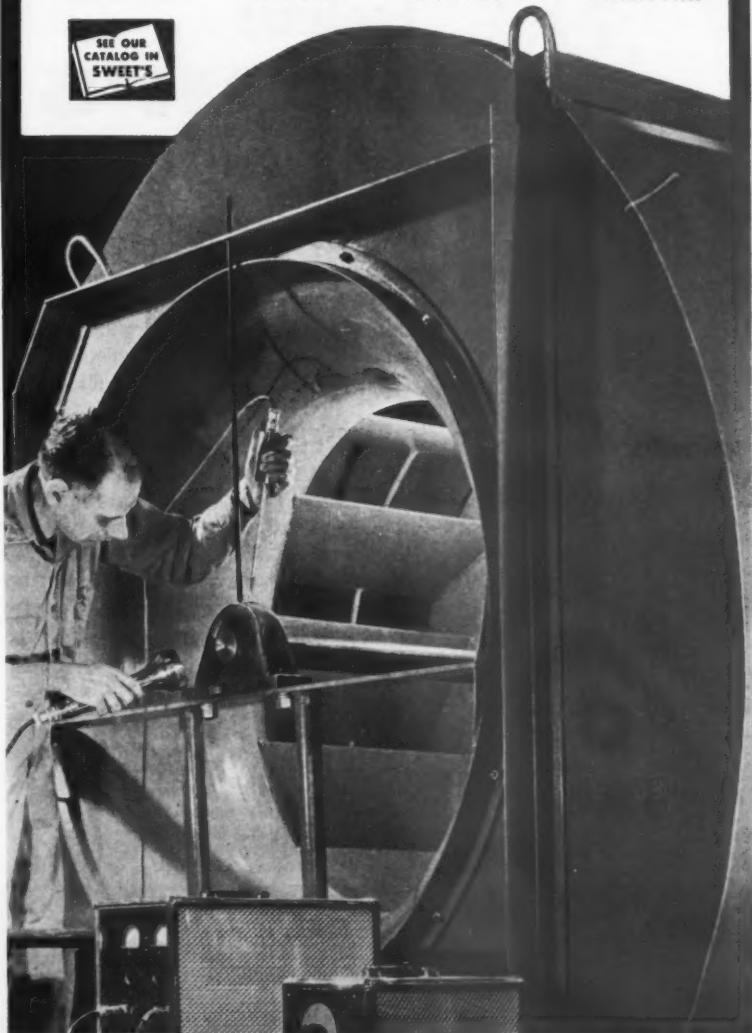
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## \$2,500,000 Research Center Planned by Boeing

SEATTLE — Boeing Airplane Co. has announced plans for a \$2,500,000 three-story research center to house the Boeing Scientific Research Laboratories. Site of the new structure, which will be an expandable building of metal and glass, is on the west side of the Duwamish River near Seattle's south city limits.

Scheduled for completion in about a year, the laboratory will have a main floor consisting of 24 laboratories, but with movable walls. Usable floor

space will be about 65,000 sq. ft.

About 80 persons are currently associated with the research organization, established in 1958, to develop basic information for use by Boeing's five manufacturing divisions.

## Drake Steel Acquisition

LOS ANGELES — Drake Steel Supply Co., has announced acquisition of Zurbach Steel Co., steel distributor with a plant at 2035 Camfield Ave. Zurbach will be a division of Drake Steel and its plant will continue operation as a steel processing facility for sheet and strip steel.

## \$2,000,000 Expansion Under Way at Pennsalt

PORTLAND — Additional building construction—part of a \$2,000,000 expansion program—is well under way at the Pennsalt Chemicals Corp. plant, 6400 Front St. The expansion program is designed to increase the output of a rocket fuel ingredient which the firm began making last year.

Extensive installations of new equipment for the electrolytic manufacturing process are included in the project, which began some months ago and is scheduled for completion before the end of the year.

Capacity of the plant for producing ammonium perchlorate—an oxidant used in solid fuel propellant systems—is expected to be increased by several thousand tons. Pennsalt is also expanding some 25% the plant's facilities for sodium chlorate, which is the raw material for ammonium perchlorate.

## Bethlehem Steel Changes Western Corporate Set-up

SAN FRANCISCO—Bethlehem Steel Co., Bethlehem, Pa., has announced changes in the corporate structure of its West Coast operations. Effective July 1, the steel division of Bethlehem Pacific Coast Steel Corp. became Bethlehem Steel Co., Pacific Coast Division. Shipbuilding and ship repair divisions of Bethlehem Pacific became Bethlehem Steel Co., Shipbuilding Division, Pacific Coast District.

Bethlehem employs about 10,000 persons in its steel plants and fabricating works in the West.

## Northwest Petrochemical Plans \$500,000 Facility

ANACORTES, WASH.—Northwest Petrochemical Corp., Vancouver, Wash., has revealed plans for building a \$500,000 chemical plant here for manufacture of chemicals out of by-products of the area's petroleum refineries.

According to Allen Perkins, president of the firm, the new facilities will convert acids from waste products into phenol and cresol chemical compounds. Bulk of the products will go into manufacture of glue for the Northwest plywood and particle board industries.

## Kaiser Reopens Potline

SPOKANE—Reopening of another production potline at its Mead plant here has been announced by Kaiser Aluminum & Chemical Corp. About 135 men were recalled to work for operation of the 22,000-ton-capacity line.



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## New NW Warehouse Speeds Service for Dodge Mfg.

MILWAUKEE, ORE. — In an expansion move, the Dodge Manufacturing Corp. has opened a Pacific Northwest warehouse at 2515 S. E. Stubb St. to provide overnight service to all parts of Oregon, Washington, Idaho, Montana and British Columbia.

The warehouse will stock about 4,000 different items, including bear-



STAFF AT new Dodge warehouse includes Marion Studebaker, left, and John Moore.

ings, V-belt drives, speed reducers, roller chain, sprockets, couplings, conveyor pulleys and fluid drives.

Marion Studebaker, Northwest sales representative, explains: "The products stocked by this new warehouse will be very definitely tied in with industry in the area. For example, one of the items we will stock will be air clutches for plywood mills."

Warehouse manager will be John Moore, who has had many years' experience with industrial equipment in the Northwest. Mr. Moore will have a crew of about five, which will be aided by the latest Kardex filing systems and material handling equipment.

The 10,000-sq. ft. warehouse will open officially August 1. Room has been provided for future expansion.

## Foam Rubber Plant Starts Operations in Arizona

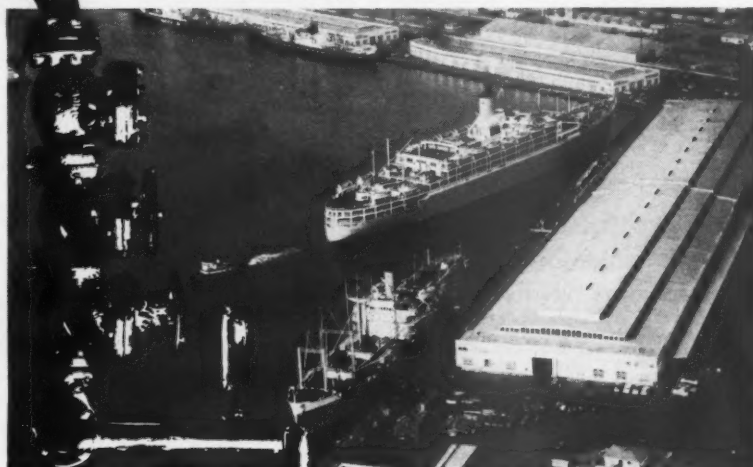
PHOENIX—A new \$100,000 foam rubber manufacturing plant, the first of its kind in Arizona, began operations in June at 1718 W. Buchanan. The new facility is General Foam of Arizona, owned by Raul Marin, operator of Arizona Spring Co., 1403 S. 27th St.

The firm will be fabricating distributor for General Tire & Rubber Co.'s cushioning material, polyfoam.

## Moves to Portland Plant

PORTLAND—A new plant at 6621 N. St. Louis Ave., has recently been occupied by Medford Machinery Co., forest industries engineering, contracting and manufacturing firm, formerly of Medford, Ore.

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Phone or write for complete information. A Service Engineer will be happy to demonstrate the many uses of "POP" Rivets anywhere in Southern California.

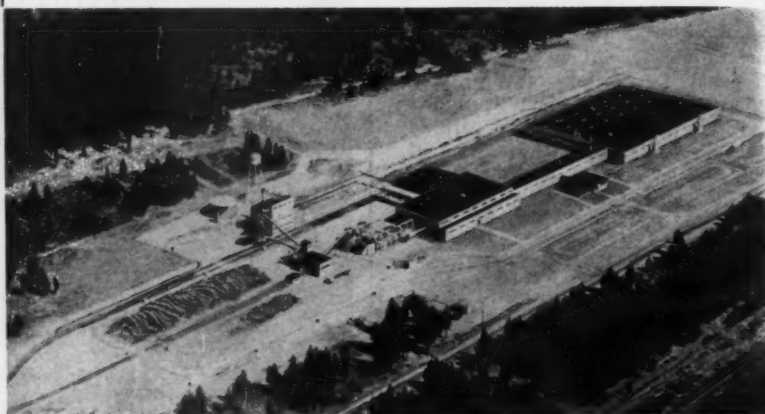
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74

## Johns-Manville Plant in Oregon Dedicated



KLAMATH FALLS, ORE.—First major manufacturing plant to utilize lodgepole pine on a major commercial scale is this Johns-Manville Corp. insulating board facility for which dedication ceremonies were held June 30. Its completion marks the latest step in the firm's long-range \$30,000,000 expansion program in the West.

Located 22 miles north of here, the plant comprises six groups of buildings with 285,000 sq. ft. of floor space. Over-all length of the mill building is 300 ft. Employment is about 250, with an annual payroll of \$1,250,000.

Insulating board products made at the new facility are natural finish building board, decorative ceiling panels and wall plank, insulating board sheathing, acoustical panels and roof insulation, including a new roof deck product that provides planking, insulation and inside finish in one operation.

Major equipment includes two massive grinders, with grinding stones 67 in. in diameter and weighing 8 tons each. The material handling system includes use of a large crane that takes wood from the storage yard and places it into a conveyor for the manufacturing process, which requires little or no manual assistance.

W. H. Graham is manager of the new plant., seventh to be established in the West by the company. Others are at Corona, Stockton, Watson, Pittsburg, Lompoc and Los Angeles, Calif.

## A. C. Horn Completes Another Addition

LOS ANGELES—Latest addition to facilities of the A. C. Horn Companies Division, Sun Chemical Corp., has been completed on a 5½-acre site in Bell Gardens.

Fourth addition to Horn's Western operations in the last two years, the new building will house the Southern California and sales administrative staff, which also serves Arizona.

Horn is a large manufacturer of caulking compounds, waterproofings, floor materials and technical coatings.

## Carl Biggs Adds Custom Fabrication Department

SANTA MONICA, CALIF.—Carl H. Biggs Co., 1547 14th St., manufacturer of epoxy products, has recently added a custom fabrication department as part of its current expansion program. Dudley P. Biggs has been named manager of the new department, which gives the firm facilities for work involving bonding, potting, encapsulating and sealing with epoxy resins.

## Air Pollution Prevention in Union Oil Expansion

LOS ANGELES—A new \$17,000,000 refining program that includes extensive plans to prevent air pollution has been announced by Union Oil Company of California. A carbon monoxide boiler, costing some \$1,500,000, to reduce the quantity of carbon monoxide emitted to the atmosphere, is part of the project, bringing the firm's air pollution prevention expenditures to \$10,000,000, officials said.

Among new facilities, scheduled to be in operation within 15 months, are a 14,000-bbl.-a-day catalytic reformer and three Unifiners—of 17,400, 14,000 and 10,000 barrels per day capacity.

## New Richmond Facility

RICHMOND, CALIF.—Plans for a new plant to permit expanded manufacturing operations have been announced by ASP Steel Products Co. of Berkeley, which fabricates structural, ornamental and miscellaneous steel products. Located at 301 Ohio Ave., the facility will be occupied in August.



## Two Western Projects in Aeroquip Expansion

LOS ANGELES—A new engineering center for its Marman Division here and new production facilities for the Western Division in Burbank will be parts of a \$2,400,000 capital expenditure announced by Aeroquip Corp., headquartered in Jackson, Mich.

Six major projects are included in the expansion program that will add 140,000 sq. ft. of working area during the next 18 months. Among these are a new plant for the Elbecco Division, an extension to the Jackson Div. plant, an addition for the industrial division in Van Wert, Ohio, and a laboratory for products used on rockets and missiles, in Jackson, Mich.

## Lunkenheimer Opens Sales Offices in L.A. and S.F.

SAN FRANCISCO—The Lunkenheimer Co., Cincinnati, O., manufacturer of valves and engineering devices, has announced opening of new Western Division sales and engineering offices here and in Los Angeles.

Lawrence L. Bradford heads the San Francisco office at 420 Market St., while Newton R. Crum is in charge of the Southern California-Arizona territory office at 1417 Georgia St. L. Allan Barth and Robert A. Miles are sales representatives in that area.

Lunkenheimer's products are also distributed in the West by Ducommun Metals and Supply Co., C. W. Marwedel Co., Republic Supply Co. and other firms.

## Viking Forge Installs New Ring Rolling Mill

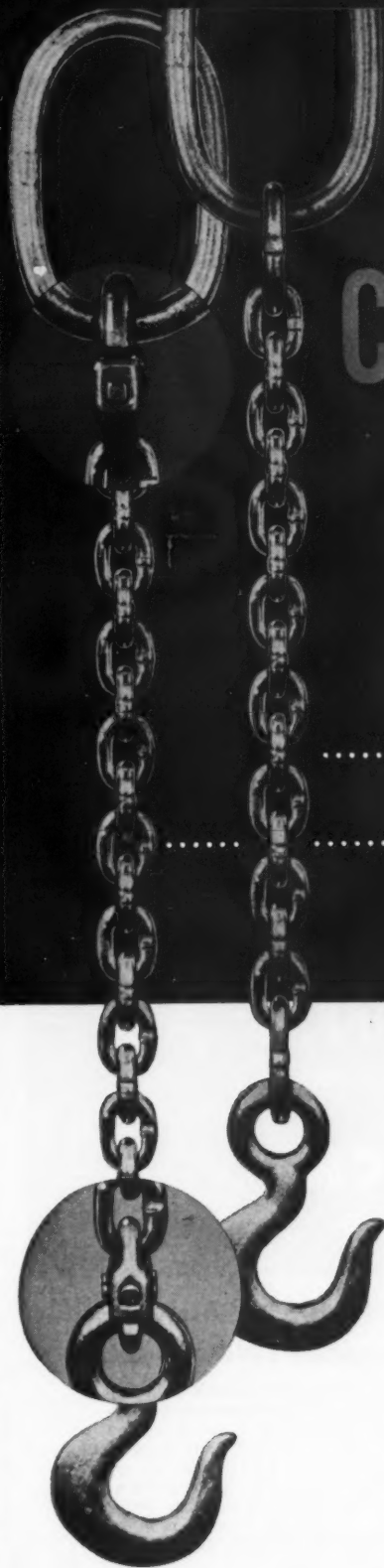
ALBANY, CALIF.—Viking Forge & Steel Co. has installed an automated single pass ring rolling mill that will finish roll in a single heat producing rings or flanges with simple or complex cross-sections, within close tolerances. Built in Germany, the 50-ton mill is said to be the first integrated mill of its kind in the country.

It is installed in a pit which contains basic frame, drive elements and gear base. Above floor level to about eight feet in height are the horizontal mandrel carriage and supporting device, pressure and guide rolls and the control desk.

## Clough Buys Plant Site

SEATTLE—Clough Equipment Co. has recently purchased a 4½-acre South End industrial tract for construction of a large fabrication plant and offices within the next 18 months. Clough is currently located at 2739 Sixth Ave. S.

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### Bay State Warehouse



**DESIGNED TO EXPEDITE AND IMPROVE** service to customers in the West, this new branch office and warehouse was opened recently by Bay State Abrasive Products Co. of Westboro, Mass. It is located in Long Beach, Calif., at 3480 Cherry Ave., where the telephone numbers are GARfield 7-2983 and 7-4947. Bay State abrasive engineers serving in the West are **Robert F. Kelleher, Ben F. Guy, Emil F. Rogers and John R. Anderson.**

### Ideal Opens New Mexico's First Cement Plant

ALBUQUERQUE, N. M.—This state's first cement plant, a \$14,000,000 facility that is among the most highly instrumented in the world, was dedicated here recently by Ideal Cement Co.

Annual productive capacity of the plant at Tijeras, near here, will be in excess of 1,000,000 barrels. In normal operation the plant will use some 3,500,000 cu. ft. of natural gas and 76,000 kw. of electricity per day.

Heart of the plant is the 375-ft. kiln, which weighs 2,173,661 lb. The facility has a total of 33 dust collection systems using 1,280 glass bags that contain over two acres of glass cloth.

### Thomas A. Short Named by Barrett-Cravens

SAN FRANCISCO—A new representative in the Bay Area has been appointed by The Barrett-Cravens Co., Northbrook, Ill., manufacturer of material handling equipment.

The new representative is the Thomas A. Short Co., 3430 Wood St., Oakland, specialists in industrial and marine equipment for the last 25 years.

### Sealy Mattress Expansion

PORTLAND—Sealy Mattress Co. of the Northwest has revealed plans for a \$125,000 expansion program for its plant at 2337 NW York St

## Forest Products Research Seeks New Wood Uses

SAN FRANCISCO—New and wider use of wood was analyzed by over 1,000 experts who met here at a five day meeting of the Forest Products Research Society.

Theme of the conference, "Research for Profit", was emphasized by former Army General James M. Gavin, who spoke at the Official Luncheon.

General Gavin pointed out that the forest products industry is on the threshold of discovery. He said that this is analogous to the petroleum industry before the introduction of advanced refinery methods . . . and the subsequent development of superior products.

"The utilization of the tree has not begun to reach this level," said General Gavin.

Western themes were prominent throughout the technical sessions. Peter H. Kochler, vice president and general manager of Coastal Veneers, Inc., Crescent City, Calif., spoke on "The Potential of Western Hardwoods and Veneers." Mr. Kochler concluded with the fact that the Eastern hardwoods are growing more and more scarce and the Western species are yet virtually untapped.

"The secret to the success of these woods will be the type of promotion used to launch the various species," added Mr. Kochler.

"Pallet Bins for Harvesting Apples in the Pacific Northwest" was the subject of a talk by S. W. McBirney, U.S. Dept. of Agriculture, Wenatchee, Wash. Mr. McBirney said that the use of pallet bins for fruit is rapidly being adopted in the Pacific Northwest. Mr. McBirney remarked: "The change to bins and a related change in shipping containers for Northwest apples forecast a reduction in the annual lumber requirement for handling and shipping the crop to around a tenth of the 150,000,000 board feet required just a few years ago."

Potential improvements in pallet nailing were described by Dr. E. George Stern, Virginia Polytechnic Institute. Dr. Stern suggested that the conventional nail can be replaced with a 24% lighter, 2 1/4 x 0.110-in. hardened nail with an especially effective helical thread in the fastening of hardwood deck boards to hardwood stringers. He also recommended the use of a well-shaped blunt chisel point to reduce the end splitting of deckboards.

A Westerner, Raymond H. Berry, Scott Lumber Co., Inc., Burney, Calif., was installed as president-elect. He will serve in 1960-61.

# BRODHEAD

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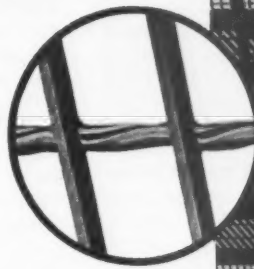
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BLAW-KNOX Grating Representatives Are Located In Principal Western Cities.



## Wooden Pallet Ass'n. Adopts Aids to Users

SAN FRANCISCO—In its first meeting in the West, the National Wooden Pallet Manufacturers Association has incorporated the Western division into the national organization and has adopted a 4-point Pallet Program to aid pallet purchasers.

Here are the four points of the pallet program:

1. The establishment of a system of marking based on quality. There will be three Softwood grades (Select, Standard, Commercial), and four Hardwood grades (Precision, Premium, "AA", "A"). The marking system acts as an assurance that users will get what they specify in a pallet.
2. Inspection procedure. This will be a list of recommended inspection procedures that will enable a buyer to know how to exactly evaluate the product he is receiving.
3. Specification Analysis Service. The Association staff would render technical service on user specifications to determine if they were the most suitable for the user.
4. Pre-award Survey. This would help purchasers of pallets to determine whether a given mill or supplier is equipped to best execute the order. This would be in the form of a check list which the user could use himself

or with the assistance of the Association.

Literature will be available this year on the points above.

Another project that the Pallet Association is working on—in cooperation with the American Standard Assn.—is to set standard sizes of pallets. Nineteen (19) standard sizes have been adopted for interchange use. These sizes will be released soon by the ASA.

The Western division has been incorporated into the national organization. The division was originally setup because most of the pallets manufactured in the West are softwood, while those in the East are hardwood. *Gordon W. Dennis*, Newark, Calif., was Western president, and *A. P. Carroll*, Los Angeles, vice president.

Other programs that the Association is working on are establishment of a pallet pool in the United States, the use of pallet containers, and the leasing and renting of pallets.

The National Wooden Pallet Manufacturers Assn. is composed of 96 companies, 18 of which are in the 13 Western states. Information on any phase may be obtained from *William H. Sardo, Jr.*, Executive Vice President, Barr Bldg., Washington 6, D.C.

## Belond Industries, Inc. Building New Plant

TORRANCE, CALIF.—A "round office" is a feature of the manufacturing and warehousing plant being built here by Belond Industries, Inc., to give the firm one of the most modern and completely equipped steel tube producing and processing plants in the West.

The building will have 100,000 sq. ft. under cover, 30,000 of which will be for warehousing.

The manufacturing plant will include facilities to convert giant coils of steel into many widths. Two crane-ways will be installed to handle raw materials and finished products. The two tube mills will produce rounds, squares and shapes with a size range from 5/8ths to 4 1/2 in. O.D.

## W. B. Semco Moves Into New Quarters

LOS ANGELES—New and larger facilities have been occupied recently by W. B. Semco & Associates, industrial engineering consulting firm. Present location is a newly constructed building at 8255 Sunset Blvd., where the telephone number is Oldfield 6-6750.

The firm, which specializes in plant layout, material handling, warehousing and order processing systems, has also recently increased its personnel.

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WESTERN INDUSTRY/JULY 1959



## American-Marietta Opens Seattle Research Center



SEATTLE—A \$1,000,000 research center that will be used primarily to promote the Pacific Northwest's basic wealth—its forest products—was dedicated here last month. The expanded laboratories built for the adhesive, resin and chemical division of American-Marietta Co. are located at 3400 13th Ave. SW on Harbor Island.

Research and its importance was the theme of the dedication ceremonies attended by top state and area officials and leading industrialists from

the Northwest and Canada. A tour of the new laboratories and other facilities included demonstrations and exhibits.

The new center brings the company's investment in this area to about \$5,000,000, with a working force of about 150 in Seattle. Research activities in the center will be in fields of plywood, composition boards, paper, corrugated containers, pulp moldings, mineral wool, foundry cores and shell molds.

## Further Plant Expansion for Librascope, Inc.

GLENDALE, CALIF.—Librascope, Incorporated, broke ground recently for an 85,000-sq. ft. addition to its Glendale headquarters. Scheduled for November completion, the new facility will provide more production space for assembly of electronic computers and associated equipment the firm is developing.

The new building and land represents an investment of some \$1,300,000. It is located on a 4½-acre site in the Grand Central Industrial Centre, where Librascope is also leasing a 40,000 sq. ft. building on Rodier Drive to house some of the engineering division.

Librascope, a subsidiary of General Precision Equipment Corp., New York, is a leading supplier of weapon control systems and computers for anti-submarine warfare. With new construction and leases, the firm will have 500,000 sq. ft. of floor space.

## Boise Cascade Merger

BOISE, IDA.—Boise Cascade Corp. has announced merger of Valsert Lumber Co., Portland and the Herbert A. Templeton Lumber Co. of Spokane and Portland, with the Boise firm. The two Northwest firms will become subsidiaries of Boise Cascade.

## Huck Mfg. Makes Second Expansion Move in 3 Years

HAWTHORNE, CALIF.—Second expansion for its Western operation in less than three years has been announced by Huck Manufacturing Co., on its move to a new building at 220 N. Daphne. The larger quarters will more than double the space provided at its previous Inglewood location.

The Western branch building houses a large warehouse for fastener and tool stock, a service facility for Huck fastener installation tools and Western sales division offices.

## Stauffer Unit to Move

RICHMOND, CALIF.—Construction of an addition to its plant here to house the insecticide formulating facilities, now located in Berkeley, has been announced by The Stauffer Chemical Co. The new unit will be built at an estimated cost of \$200,000.

## New Seattle Construction

SEATTLE—Plans for construction of a \$250,000 warehouse and office building at 5901 Fourth Ave. S., have been revealed by Charles Bruning Co., Inc., manufacturer of office copying and engineering reproduction machines and engineering supplies.

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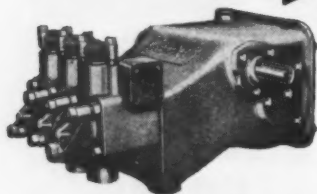
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80

## New Office-Warehouse Facility for Bay Area



delivery of cranes through local fabrication, supplement distributors' inventories and offer a completely-equipped Shaw-Box product service and Bugit repair center manned by factory-trained personnel.

**THIS NEW** warehouse and office facility opened recently by Manning, Maxwell & Moore is aimed at giving better service and delivery to Shaw-Box crane and hoist distributors in the Bay Area. Located at 450 Bayshore Blvd., San Francisco, the 5,000-sq. ft. installation, which houses district sales offices of the firm, will speed

## Use of Coal Mine for Gas Storage Studied in Colorado

DENVER — A study aimed at converting the Leyden coal mine near Arvada into a storage vault for 3,000,000,000 cubic feet of natural gas has been announced by the Public Service Co. of Colorado.

If preliminary reports, already termed encouraging by company officials, are supported by later tests, PSC will spend an estimated \$5,500,000 in the conversion project, the first such use of a coal mine in the world, ac-

cording to company officials.

The storage project, announced by Donald J. Miller, vice president in charge of PSC gas operations, would increase by almost one-half the amount of gas available for peak usage in the Denver metropolitan area, heading off a threatened shortage next winter.

## Bralco handles New Haven Copper, Riverside-Alloy

LOS ANGELES — Bralco Metals, Inc., warehouse distributor specializing in non-ferrous metals, has been appointed to handle lines of the New Haven Copper Co. and the Riverside-Alloy Metal Division of H. K. Porter Co., Inc.

The appointments permit Bralco to offer immediate delivery on a wide range of copper in sheet and coils, phosphor bronze, beryllium copper and nickel silver alloys in a wider range of hardness, treatments and form than previously available in the West. Sheet, plate, anodes, coil rod and bar stock will be offered in many alloys.

## ICC Approves Acquisitions by Consolidated Freightways

MENLO PARK, CALIF.—Interstate Commerce Commission approval concerning acquisition of four motor carriers and certain operating rights of a fifth has been announced by Consolidated Freightways, Inc.

The carriers involved are Gallagher Freight Lines, Inc., Denver; Arizona Express, Inc., Tucson; Martin Transfer Co., Longview, Wash., and Kenneth Poorman Co., Inc., Portland.

The transaction also involves certain operating rights of Buckingham Transportation Co., between Fargo, N. D., and Winnipeg, Man., Can.

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## Linde Liquid Storage Unit for Earle M. Jorgensen Co.



**FIRST INSTALLATION OF ITS** kind for industrial use in the Bay Area is this storage and distribution installation to supply gaseous oxygen for shape-cutting of steel. It was put in operation recently at Earle M. Jorgensen Company's steel warehouse, 700 Pennsylvania Ave., San Francisco. Shown inspecting it are P. C. Childs, vice-president, left, and W. W. Fenstermacher, manager, at Jorgensen's. The unit consists of a vacuum-insulated tank which stores the gaseous equivalent of 25,000 cu. ft. of oxygen in liquid form at 300 deg. below zero.

## California Cotton Mills Names Four Distributors

**OAKLAND**—California Cotton Mills Co. has named four food brokerage firms as distribution outlets in the West for its clothesline, mops and similar products.

In the Sacramento Valley, the sales representative is the Joseph B. Lynn Co., 2357 Fifth St., Sacramento. In the Colorado area, California Cotton Mills products will be handled by McComb & Associates, 933 W. Evans, Denver.

In Arizona, the L. D. Allen Brokerage Co., 301 W. Jackson, in Phoenix, has been appointed, and in the San Francisco Bay Area, Theobald Brokerage Co., 112 Market St.

## Astoria Plywood Plans \$1,250,000 Expansion

**PORTLAND**—An expansion program that will increase plywood production by 75%—from 4,000,000 ft. to more than 7,000,000—has been announced by Astoria Plywood Corp. The \$1,250,000 project to be completed by the end of the year will also add personnel.

An enlarged log pond, a new hydraulic barge, a six-deck automatically fed Moore drier, a 24-opening hot press, a new chipper plant that will triple present chip output, and an additional building are planned.

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## GE Moves Atomic Division Headquarters to California

PALO ALTO, CALIF.—First transfer of a General Electric Co. division headquarters from the East to the West has been announced by Dr. Lyman R. Fink, general manager of the atomic products division. More than 75 per cent of the division's employees and facilities are in Washington, Idaho and California.

Dr. Fink, with the division's legal engineering and consulting staff from Schenectady, N. Y., moves here this month to a new office building at 701 University Avenue.

The move was made in order to be nearer three of the division's components, the atomic power equipment department (APED) in San Jose, Calif.; the Hanford atomic products opera-

tion (HAPO) near Richland, Wash., and the Idaho Falls test station. The move marks another step in General Electric's Western growth that has seen its investment and employment double during the decade.

### C & D Seattle Rep

SEATTLE—C & D Batteries, Inc. has named the Joseph C. Platt Co., as sales and service organization for the Conshohocken, Pa., battery manufacturer. Joseph C. Platt, Sr., heads the 15-year old firm which will cover Oregon, Western Washington and Alaska.

### Idaho Power Co. to Spend \$20,000,000 for Facilities

POCATELLO, IDA.—Idaho Power Co. will spend \$20,000,000 for new facilities in 1959, according to T. E. Roach, president.

Reviewing the utility's past progress

and future plans before the regional meeting of company share-owners here recently, he said a lion's share of the 1959 investment will be spent on Oxbow Dam, steadily moving toward completion in 1961.

### Western Dealers Named by Rapids-Standards Co.

SAN DIEGO—Among dealers appointed recently by Rapids-Standard Co., Inc., Grand Rapids, Mich., to handle Rapisteel slotted angle and Rapistan casters is Winn Supply Co., 1676 Main St.

Other Western dealers include Air-Mac, Inc., of Washington, located at 3838 Fourth Ave., So., in Seattle, and M. E. Canfield Co., 419 E. Third St., Los Angeles. All will offer the slotted angle in two sizes, 14 and 12 gage. The Winn and Canfield firms will also service industrial requirements from large stocks of Rapistan steel-forged and cold-forged casters.

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WESTERN INDUSTRY/JULY 1959



## Contracts for the West

CHULA VISTA, CALIF. — Announcement by *Rohr Aircraft Corporation* of new orders totalling \$37,700,000 highlights the news of contracts reported recently by manufacturers in the West. Rohr's orders are for jet pods for the Lockheed Jetstar business airplane; pods and other components for the Boeing B-52H long range bomber, and various components for the 707 series of commercial airliners.

Eighteen Bay Area firms are among 21 companies and research centers that received \$36,200,000 worth of orders from the San Francisco Ordnance district. Most of this went to *Food Machinery & Chemical Corp.* of San Jose for aluminum armored personnel carriers (June WI, page 114). Army Ordnance research programs are continuing at Stanford Research Institute, University of California at Berkeley and University of Oregon.

Other Bay Area contracts, amounts and scope of work are:

*Pacific Tire and Rubber Co.*, Oakland: \$253,326 for tires and capping materials;

*American Can Co.*, San Francisco: \$140,311 for gages;

*Ampex Corp.*, Palo Alto: \$70,679 for magnetic tape recorders;

*Laher Tire and Spring Co.*, Oakland: \$65,176 for automotive spring assemblies;

*Beckman Instruments, Inc.*, Richmond: \$37,250 for computers;

*Dymec, Inc.*, Palo Alto: \$23,240 for digital tape punching system.

*Convair Division of General Dynamics* reports receipt of a \$2,000,000 follow-on contract from *Autonetics* for design and manufacture of a radar for a navigation bombing system.

Other Western companies that fig-

ure in recent contract news include:

*B. J. Electronics, Borg-Warner Corp.*, a U. S. Army Signal Corps contract addition for GMD-1 transportable ground tracking and a data-recording equipment;

*Lear, Incorporated*, a \$3,600,000 follow-on order to supply coordinate converter systems for the early version of the Boeing Bomarc IM-99;

*Hallamore Electronics Co.*, division of the Siegler Corp., a contract for about \$500,000 for airborne computers and associated test equipment for the Vega outer space rocket, awarded by the *Jet Propulsion Laboratory* of the California Institute of Technology;

*Telecomputing Corp.*, contracts totaling \$500,000 for aircraft valving equipment for *United Aircraft* and *Boeing*; with work to be handled by the *Whittaker Controls Division*;

*Robertshaw Fulton Controls Co.*, follow-on contracts for nearly \$1,000,000 for stability augmentation amplifiers used on Convair's F-106 Delta Dart, all-weather jet interceptor plane;

*Pacific Car and Foundry Co.*, Renton, Wash.; a \$472,253 defense procurement contract principally for spare assemblies for the M-55 gun;

*Boeing Airplane Co.*, orders for seven turbine-powered pneumatic starting units from Pan American World Airways.

*Summers Gyroscope Co.*, orders from Convair-Pomona, Convair Division of General Dynamics, in excess of \$980,000, for units to be used in the U. S. Navy Terrier and Tartar missiles, and

*Telecomputing Corp.*, additional contracts for about \$1,500,000 from the Air Force's Air Material Area at San Antonio, Tex., for manufacture of spare valve components.

## Torrington Co. Forms Sales Subsidiary in West

VAN NUYS, CALIF.—Machine Sales West is a recently-formed subsidiary company established by The Torrington Manufacturing Co., at its Western Division plant here. The new organization is responsible for sales and service of all metal forming equipment produced by Torrington's machine division, including spring coilers, wire flattening mills and the new Verti-Slide machine for precision, high-speed forming of wire and strip parts.

Machine Sales West is headed by *M. A. Joulsohn*, vice-president and general manager of the Western Division. Field sales are supervised by *William McFarlane*.

## Appointment for Tornquist

BURLINGAME, CALIF.—Tornquist Machinery Co. has been appointed dealer in the San Francisco area for power presses, fabricating tools, punching tools and dies manufactured by the Cleveland Punch & Shear Works, Cleveland. Tornquist also represents the Cleveland firm in Southern California, through its main office in Los Angeles.

## New Santa Ana Plant

SANTA ANA — Engineered Electronics Co. has started construction on a 23,000 sq.-ft. production building on Chestnut Avenue and McClay St. A subsidiary of Electronic Engineering Co., the firm develops and manufactures plug-in electronic circuits.

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## westerners at work

■ **Jack L. Ashby** and **Donald A. Rhoades** have been elected as top executives for two Kaiser groups headquartered in Oakland. Ashby, who was named president and chief executive of Kaiser Steel Corp., has been with Kaiser Steel since 1942, serving as vice president and general manager since 1948, after filling various key posts with the firm. Rhoades, elected president and chief executive officer of Kaiser Aluminum & Chemical Corp., first joined Kaiser 32 years ago as a gravel inspector. Later he was with Permanente Metals Corporation, predecessor of Kaiser Aluminum. Since 1946 he has been vice president and general manager of the aluminum corporation.

■ **William H. Sharp** has been named works chief engineer at Aluminum Company of America's Vernon, Calif., works. Previously with the firm at Alcoa Research Laboratories and in Indiana and Pittsburgh, he has also been with the construction engineering division and helped supervise major expansion programs for Alcoa in Cleveland, and in Davenport, Ia.

■ **Hugo Baldelli** has been transferred by Byron Pumps, Inc., a subsidiary of Borg-Warner Corp., to Los Angeles, where he is Southwestern Regional manager covering Southern California, El Paso, Tex., western New Mexico, Arizona, Utah and parts of Colorado,



**R. G. Petersen**  
I-T-E Circuit-Breaker



**J. L. Ashby**  
Kaiser Steel



**D. A. Rhoades**  
Kaiser Aluminum



**Paul Christopher**  
Stephens-Adamson

Nevada, Wyoming and Montana. Associated with the firm for 10 years, he moves to Los Angeles from Greenville, S. C., where he has been Southeastern regional manager. Baldelli replaces **R. A. Winsryg**, who will affiliate with Byron Jackson's dealer organization.

■ **Robert G. Petersen** has been named new Western regional sales manager by the I-T-E Circuit Breaker Co., Philadelphia, with offices in San Francisco, new regional headquarters for this area. The new office is in Room 106, Rialto Bldg., 116 New Montgomery St. The Denver office at 655 Broadway Bldg., was previously regional headquarters and now will serve as a district office.

■ **Charles W. Ashcom** has been promoted to chief metallurgical engineer, engineering and planning division, at Kaiser Steel's Fontana, Calif., plant. An employee of the firm since 1953, he has been serving as senior metallurgical engineer. In his new capacity, he will head the newly created department of metallurgical engineering, with responsibility for contracts, specifications and physical testing.

■ **Gerald L. Jensen** has joined A. M. Byers Co., with the position of field service engineer for the Pacific Northwest and offices at 574 Dexter Horton Bldg., Seattle. Before joining Byers, Jensen was associated with the Crane Co. in Seattle.

■ **Walter E. Sargent** is the new supervisor of production engineering for Stromberg-Carlson—San Diego, division of General Dynamics Corp., where his responsibilities will include tool design, time studies and other phases of production of shaped beam tubes and high-speed electronic printers. Recently with Zenith Radio Corp. in Chicago, he has been with other firms there and also with Ford Motor Co.

■ **Paul A. Christopher** has been transferred to Los Angeles as district manager of the engineering sales offices for Stephens-Adamson Mfg. Co. Christopher has been with the firm since 1949 and has been district manager of the Chicago branch office since 1954. Stephens-Adamson's Los Angeles offices are at 2227 E. 37th St.

■ **Thomas H. Mitchell** has joined Calstrip Steel Corp., Los Angeles, as metallurgist in charge of quality control for stainless steel strip, low carbon and spring steel strip. Appointed earlier this year, Mitchell has been involved in the annealing and pickling operations of Calstrip's production of stainless steel strip.

■ **Sven I. Thoolen** has been appointed general manager of California Cotton Mills Co., after serving with the Oakland firm as a consulting engineer since 1957. Thoolen was previously associated with Drysdale and Schedler, National Automotive Fibres and California Ink Co.

■ **A. S. Glikbarg** as president heads the officers of Pacific and Atlantic Shippers, Inc., a freight forwarder and new subsidiary of Pacific Intermountain Express Co. **C. G. Zwingle**, **F. P. Lucas**, **J. W. Gimbel, Jr.**, **G. H. Kunzer**, **I. G. Hodge** and **P. T. Wolf** are other officers.

■ **Arthur H. Uhler** is the newly-appointed Western regional manager for Richards-Wilcox Mfg. Co., Aurora, Ill. Uhler will cover the Western states from headquarters at 2323 W. 3rd St., Los Angeles, where his telephone number is DUnkirk 8-6173.

■ **Tony Schefino** has been promoted to the post of Oakland plant superintendent for Gerber Baby Foods, replacing the late **Sam Kai Kee**. Schefino has been in the canning business for 25 years and since 1943 assistant superintendent at the Oakland plant.

■ **Henry G. Neubaumer** has been appointed a sales engineer for the Jeffrey Mfg. Co., Columbus, O., covering Northern California and the Pacific Northwest. Neubaumer has headquarters in Jeffrey's Western office and warehouse in Burlingame, Calif., where he has recently served as manager. In that position he is succeeded by **Paul Liska**, who came there from Akron, O. The Jeffrey organization includes a sales engineer for Southern California, as well as **William Davis**, Western manager, who operates throughout the entire area.

■ **Arthur L. Webb** has been selected as production manager of Microwave Electronics Corp., Palo Alto, in charge of plant facilities and development of a production force for the new firm. Recently with the Electron Tube Division of Litton Industries in San Carlos, he has also been associated with Hughes Aircraft's tube division and with American Telephone and Telegraph Co. in San Francisco.

■ **A. G. Fegles** has been named general superintendent of the West Coast Lumber Inspection Bureau, after serving as manager of the bureau's Seattle office, and for the last two years on special assignments working out of the Portland headquarters. The appointment was announced by **H. V. Simpson**, manager of the Bureau and executive vice president of the West Coast Lumbermen's Association. Simpson also announced appointment of **G. R. Boehmer** as manager of the Seattle office of that association.

■ **Russel J. Stainton** is the new plant manager of Perkin Engineering Corp., El Segundo, Calif. Stainton was previously associated with the Elgin Instrument Co., American Microphone Co., and Chrysler Corp.

■ **James M. Murphy** succeeds **William A. Marshall** as works engineer at the Pittsburgh, Calif., works of U. S. Steel. Marshall retired in June after 43 years service. Murphy has been with the corporation since 1941, serving as assistant works engineer since 1950. He is succeeded in that position by **Robert S. Dean**, who has been with U. S. Steel since 1937, most recently on special assignment in the San Francisco headquarters engineering office.

■ **Donald J. Gimpel** is selected to direct engineering activities for Ar-

## CLASSIFIED SECTION

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noux Corp., after serving as director of research. Gimpel was previously associated with Panellit, Inc.

### Maas Chemical is Building New Manufacturing Unit

RICHMOND, CALIF.—Construction now under way by A. R. Maas Chemical Co. on a new manufacturing unit will provide for the West its first plant for producing chlorinated phosphate, widely used in many industrial and household products.

A specialist in the manufacture of chemicals used in the West, the Maas firm, a division of Victor Chemical Works, produces a complete line of sodium phosphates and phosphoric acid at its plants here and in South Gate, Calif.

### Wilkerson Appoints Five Distributors in West

ENGLEWOOD, COLO.—Five new Western distributors have been appointed recently by Wilkerson Corp., manufacturer of compressed air filters, regulators and lubricators. Those who will handle the Wilkerson Air Products line are Bill McKee Co., 1207 W. College, Spokane, Wash.; Western Machinery Corp., 1035 Ninth Ave., S. E., Portland; Canal and Supply Co., 5320 28th Ave., N. W., Seattle; Bailey Equipment Company, 3856 California St., San Diego, and Bishop-Hill Tool and Paint Co., 203 S. Weber, Colorado Springs, Colo.

### Northwest Plywood Plants Cut Production in June

SEATTLE—Several Northwest plywood firms during June cut down production capacity because of reduced orders. Simpson Logging Co. cut its production to 80% of its five-day capacity, affecting plants in Shelton,

### POSITION AVAILABLE

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Communicate with General Superintendent

**CALIFORNIA ALMOND  
GROWERS EXCHANGE  
Sacramento, California**

Olympia and McCleary, Wash.; Portland, Albany and Lyons, Ore., and Eureka, Calif.

In Portland, Georgia-Pacific Corp. reportedly took similar action in four Oregon plants and at Samoa, Calif., and Olympia, Wash. Long-Bell Division of International Paper Co., in Longview, Wash., and the Evans Products Co. also announced that plywood production at their Oregon facilities would operate on a four-day, instead of a five-day, week.

### Plant for Aluminum Building Products

CITY OF INDUSTRY, CALIF.—Completion of a new Western plant for fabricating Lupton aluminum building products has been announced by Michael Flynn Manufacturing Co., Philadelphia. The 87,000-sq. ft. facility is located on a 20-acre site that allows for later expansion.

Complete facilities for aluminum extrusion and fabricating and warehousing of Lupton building products are provided in the new plant.

### Pollution of Waters Reduced in Washington

OLYMPIA, WASH.—Greatly reduced pollution of state waters has been announced recently by the State Water Pollution Control Association. According to **Art Garton**, commission director, installation of water clarifying units by sawmills of the Weyerhaeuser Timber Co. at Longview and Everett, Wash., have resulted in marked improvement.



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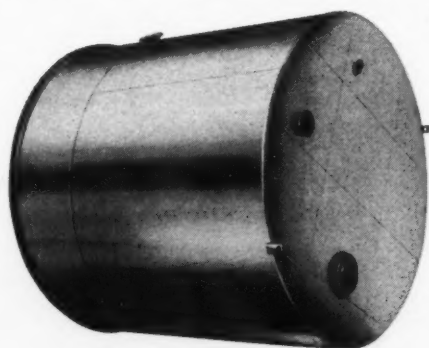
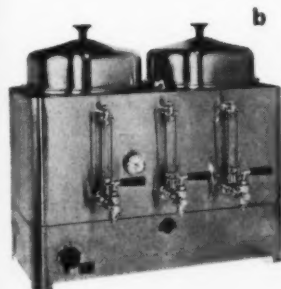
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WESTERN INDUSTRY/JULY 1959



## DUCOMMUN

### Stainless steel



**a NEW HOSPITAL ITEM COMBINES SEVERAL TYPES OF STAINLESS**  
Type 302 No. 4 Finish stainless sheets and tubes polished to No. 7 Finish, and Type 304 bar stock polished to No. 4 finish, spot and heliarc welded. This grade of stainless has excellent flatness, ease in forming, and corrosion resistance. "Rooming-in Bassinet" features basket which slips away from work area to leave unobstructed top.

**MANUFACTURED BY PEDIGO PRODUCTS, 72 E. Palm Ave., Burbank, California.** Stainless Steel supplied by Ducommun.

**b EASY-TO-CLEAN COFFEE URN FABRICATED FROM TYPE 302 No. 4 FINISH STAINLESS STEEL**—excellent deep forming properties and attractive finish—has required corrosion resistance and is impervious to chemical reaction with coffee oils. This 20" high urn, Model SSTAC-36 has ample water supply for brewing coffee or tea, and is equipped for either gas or electricity, or steam.

**MANUFACTURED BY J. H. McKIE CO., 649 Wall Street, Los Angeles, California,** from Stainless Steel supplied by Ducommun.

**c CLEAVING RESTAURANT EQUIPMENT ENTIRELY OF STAINLESS**—beautifully functional installation, fabricated from Type 302 No. 4 and No. 2B Finish stainless sheets. Good forming and welding properties in addition to resistance to corrosion and chemical reaction with food are vital in the manufacture of food handling and servicing equipment.

**MANUFACTURED BY HAROLD E. PETERSON, INC., 1350 Elwood Ave., Los Angeles, for Norm's La Cienega Restaurant, 470 No. La Cienega.** Stainless Steel supplied by Ducommun.

**d GIANT TANK CALLED FOR TYPE 304 STAINLESS STEEL**—chosen for its suitability for use where corrosion resistance must be combined with good welding and forming properties. Fabrication utilized 6,000 pounds of Type 304 Stainless Plate, 11-gage shell, 8-gage bottom, joined by automatic heliarc seam welding.

**VESSEL CONSTRUCTED BY C. E. HOWARD CORPORATION, 9001 Rayo Avenue, South Gate, California, for Columbia Wax Company, Los Angeles and San Francisco.** Stainless Steel supplied by Ducommun.

# DUCOMMUN

*... common denominator for users of stainless steel*

**d** Stainless Steel from Ducommun's complete inventories is making news today in virtually every segment of commerce and industry. The wide range of physical properties required in the manufacture and use of articles of stainless steel is represented by these products of Ducommun customers who rely on us to help select the stainless grades exactly suited to their specific applications.

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